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THE

LIFE AND LABOURS

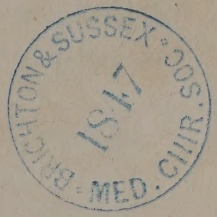
OF

SIR CHARLES BELL,

K.G.H., F.R.S.S., L. & E.

BY

AMÉDÉE PICHOT, M.D.,
AUTHOR OF
"CHARLES THE FIFTH," "CHARLES EDWARD, THE LAST OF THE STUARTS,"
ETC. ETC.



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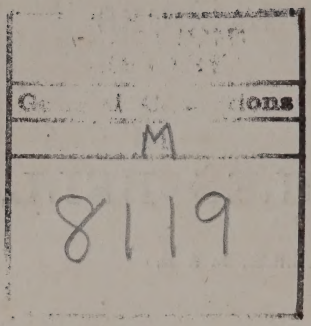

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COVENT GARDEN.

BZP(Bell)

To my Friend,

DOCTOR FAGES,

PROFESSOR-SUBSTITUTE IN THE SCHOOL OF MEDICINE AT MONTPELLIER.

My dear Friend,

I dedicate to you this little work, in memory of the days when we were seated on the same bench, at the foot of the chair of your illustrious father; and also to thank you for the first lessons in natural history which you have given to my beloved children.

Amédée Pichot, M.D.

Sèvres, Villa Boson, May, 1858.

PREFACE.

THE eminent physiologist, of whose life and labours I here offer a sketch, passed almost incessantly from enthusiasm to despondency, from the intoxicating illusions of his renown to indifference for his most important discoveries. It is related, that, struck by a sudden idea in one of his nights of meditative sleeplessness, he awoke his wife, exclaiming, with Archimedes, "*Eureka!* I pray God," he said, "not to have sent me an empty dream, or to suffer me to recover in the morning the thread of this nocturnal vision: if I see with my waking eyes what I have caught a glimpse of in slumber, I shall assuredly leave behind me an immortal name." This was the dream of the man of genius, who retires to rest and rises with his dominant thought,—one of those ideas ripened by the union of inspiration and study which science adopts, sooner or later, as the long sought for reve-

lation of truth. It was the glory alone that proved to be an illusion to Sir Charles Bell.

I had little personal acquaintance with Sir Charles Bell, and after we had exchanged one or two visits of courtesy, and a few unimportant letters, I lost sight of him for several years, devoting myself to different studies from that which had procured for me the good fortune of being introduced to him in 1822; but I had not forgotten him when his death revived all my sympathy with his character and admiration for his genius, joined to the regret of having given up a work in which he would have occupied a foremost place, and the title of which remained, barren of fruits, on the cover of my "Historical and Literary Travels in England and Scotland." I therefore seized the opportunity offered by the only article in the English Reviews which spoke of Sir Charles Bell in any detail, to write the first sketch of the biography I now publish in a more complete form; after expecting for fifteen years that a pen more distinguished than mine would associate itself with a name well deserving one of the formal panegyrics awarded by our academics to foreign scholars and artists.* But neither in England, nor even in

* The *Quarterly Review*, for May, 1843, contains a critique,

Scotland, has any history yet appeared of the life and works of Sir Charles Bell. This has emboldened me to place my obscure escutcheon under his illustrious hatchment, not without my own dream of vain-glory, in fancying that I may one day or other figure in some bibliographical note, in return for the hints or information which a future biographer may extract from this little work.

My first sketch has already been considered worthy of quotation by competent judges, such as Messrs. Flourens, Roux, and Magendie; and I have received, through Mr. Henry Reeve,* the thanks of Lady Bell, which deeply affected me. These, and other incitements, have contributed not a little to the new task I undertake in the hope of deserving them; for in this respect I resemble Sir Charles Bell;—I require encouragement before I can advance.

I have said that I was personally acquainted with Sir Charles Bell, and I shall mention here for the second time that I was indirectly indebted for

equally profound and acute, which I found very useful, especially in the quotations from Sir Charles Bell's journals. The eighth edition of the *Encyclopædia Britannica* has a biographical article by Sir John MacNeil, which is little more than a very laconic summary of the various notices, all extremely imperfect, published since 1843.

* The present editor of the *Edinburgh Review*.

this obligation to Professor Roux. With his habitual kindness, the Professor recommended me to Sir Astley Cooper, who would have felt that he was not doing full honour to the warm introduction I brought him, unless, after inviting me to breakfast and dinner, he had also requested my presence at one of his surgical operations. Unfortunately my admiration of his dexterity did not save me from an emotion rather too violently displayed, which, placed as I was by the side of the skilful operator, might have disturbed a self-possession less firm than his own. The next day I called to apologize, and while I was lamenting my *nervous system*, which would probably compel me to give up pursuits I was, notwithstanding, inclined to follow, "No, no!" said Sir Astley, "you will get over that; I must introduce you to Charles Bell, who will tell you how his courage failed on his first attempt to bleed." Charles Bell received me with equal kindness; and as Sir Astley, in his letter, had alluded to the story of the bleeding, "Sir Astley," said he, "has only spoke of my first experiment; but I confess to you, that if I had to repeat it to-morrow, it would cost me almost as great an effort." He then confirmed what I mention in his biography, that whenever he per-

formed an operation, he had to contend with the same nervous suffering.

It was to Sir Charles Bell himself that I owed the pleasure of knowing his brother practitioner of Edinburgh, Professor John Thompson, who presented me with his *Historical Sketch of Opinions on the Varieties and Relapses of the Small-pox, &c. &c.*,* and who, inviting me to attend his clinical lectures, showed me several cases of a nature to shake strongly my faith in vaccination as a certain preservative. On my return to Paris, I feared to publish all that I had read, seen, or heard on this subject. I confined myself to translating an extract from the *Opinion of the Physicians of Edinburgh.* It was not exactly my first appearance as an author, but this pamphlet procured for me something more than encouragement. Dr. Salmade did me the honour of delivering in the Academy of Medicine a set diatribe against those Erostrati of the temple of Cos, those heretics of science, who came back from England with foreign doctrines and deities! My schoolfellow and friend, Dr. Bousquet, Secretary to the Aca-

* *Historical Sketch, &c.*, published in 1812, in the form of a letter to Sir J. Macgregor. Dr. J. Thompson was at that time Professor of Military Surgery in the Edinburgh University.

demy, delivered this anathema into my hands. I took good care not to engage in a controversy; but, some years later, Dr. Bousquet, who had forgot my sacrilege, sent me his learned work on *Small-pox and Vaccination*, in which he, the Secretary to the law and the prophets, went far beyond what I had ventured in my innocent pamphlet, and quite to the extent of Professor Thompson, of Edinburgh, in his volume; so truly has Hippocrates observed, *Vita brevis, ars longa, experientia fallax.* I feel bound to record this anecdote, as I formerly related it to the great amusement of Dr. Thompson and his countryman, Sir Charles Bell, at that time his colleague in the University of Edinburgh.

I have divided this little volume into four sections; devoting the third exclusively to an exposition of the physiological labours of Sir Charles Bell. But this is not the portion that I chiefly recommend to such of my young readers as are destined to the career of science. On that point their masters have already taught, or will teach them, more than I can pretend to do. I have simply desired to show in that long paragraph, that Charles Bell, physiologist, surgeon, artist, and critic, was not the author of a single discovery, still less of a single work. But, at the moment when

my son is about to take his place on the bench of students, I have another claim on their attention; the moral of the biography I now publish may be useful to those amongst them who will read to the last page. I have lived, and have unfortunately written, until my works extend to at least sixty volumes in octavo, original or translated, either under my own name or that of another, anonymously or with an assumed signature. Having commenced author in early youth, I admit that my works are not all orthodox, although invariably conceived in the spirit of an honest man, according to the notions of the world. I trust that the present may be included in the latter list, so as to escape extreme censure.

Those who are aware of the progress of physiology since the discovery of Charles Bell, will not suspect me of affecting false modesty in speaking as I do in the third section of this little book. When I sought information on certain special questions, the authors I consulted revealed to me an entirely new system, or rather the necessity of attending two or three courses of lectures at least, either in the amphitheatre of the anatomists or the laboratory of the chemists; a pleasant obligation, if curiosity could replace the bath of Æson.

How many things I have never known, and how much forgotten! I have been compelled to refer to works, already old, in my library, and to a small number of those which have obtained the greatest note in science from 1822 to 1858; and, having completed this labour, to read over all the latest elementary treatises, so as to assure myself that I am not still behindhand. To those who are in the same predicament, I recommend, in French, the *Treatise on Human Physiology*, by Professor J. Béclard,* who bears a name already distinguished in the school; and in English, the *Principles of Human Physiology*, by Dr. Carpenter. These two works, embracing equally the leading principles of the science, supply more than a compendium of the experimental physiology of the living masters, amongst whom, in France, England, and Germany, are Messrs. Flourens, Bérard, Longet, Claude Bernard, Milne-Edwards, Brown-Séquard, Richard Owen, B. Brodie, Richardson, Wharton, Jones, Kölliker, G. Valentin, J. Müller, &c. &c. These names, and several others, were still unknown in Europe, when I attended the lectures of M.

* *Elementary Treatise on Human Physiology*, by J. Béclard, a work illustrated by two hundred and three plates. The third edition is now in the press.

Lordat, that eloquent successor of the great Barthez, to whom may be applied what Haller said of Boerhaave: "*Adeo disertè, dilucidè, candidè, vir egregius sua precepta dabat, ut pares in arte ipsa habuisse possit, in arte docendi neminem.*"

CONTENTS.

CHAPTER I.

1578 and 1774—Harvey and Charles Bell—*The Martyrs of Science*—Scotland—Illustrations of Scotland—Scotch character—John Home and Walter Scott—Popular education—Earl Stanhope—National and family traditions—The clergy—A parish minister—Maternal education—Birth of Charles Bell—His father, mother, and brothers—Edinburgh—The two Allans—The High School—The schoolfellows of Charles Bell—The University and the Faculty—Dugald Stewart, Gregory, Monro, &c.—Black and Cullen—Scotch philosophy in Scotland and France—Jeffrey, Cockburn, Thomson, Brown, &c.—The *Edinburgh Review*—The Hospital—Medical quarrels—Society in Edinburgh—The Scotch ladies and Sydney Smith—Whigs, Tories, and Jacobites—Military ebullition—Dreams of the future—The two brothers—Departure for London—Horner and Jeffrey . . . . . pp. 1 to 32

CHAPTER II.

Arrival in London — 1804 — Isolation — Rivalries between England and Scotland—Lord Melville—Pitt—Lord Bute—Wilkes—Samuel Johnson—The New Timon—The two Hunters—Lord Macaulay—Dr. Baillie and Dr. Gregory—Sir Astley Cooper—Sir Joseph Banks—Galleries of the

fine arts—Essay on the Anatomy of Expression—Criticism by Jeffrey—M. Cousin and the Spiritualistic school—Lavater, Descartes, Careau de La Chambre, Hogarth, Reynolds, &c. — Shakespeare and Mrs. Siddons — The Scotchman denounced—Cline, Abernethy, Wilkie, &c.—Attempt to obtain a chair—Private class of Sir Charles Bell—The house in Leicester-street—The invisible girl—Sir Astley and the resurrectionists—The new anatomy of the brain—Want of encouragement—Haslar Hospital and military surgery—Letters to George Bell—Delirium—Marriage of Charles Bell—Letter from Jeffrey—The Hunterian school—The Middlesex Hospital—The College of Physicians in London—Excessive sensibility—Waterloo—Mont St. Jean—Napoleon and Macbeth—Letter from Brussels—Walter Scott—Letter from Ostend—A suicide—Letter to Francis Horner—Rich clients—First memoir upon the distinction between nerves of motion and nerves of feeling—A moment of triumph . . . . . pp. 33 to 85

CHAPTER III.

Sketch of Charles Bell's system—Opinions of the ancients—Hippocrates—Aristotle—Herophilus — Galen— Celsus—Vesalius —Willis — Haller — Bichat—Gall and Spurzheim—Scarpa—Monro—Hunter—Vieq d'Azyr—Sœmmering — Newton—Cuvier—Barthez —Van Helmont — Marshall Hall—Demonstration—Thomas Young—Abernethy—M. Flourens—M. Magendie—Cosmopolite science—Parallel—Recurrent sensibility—M. Dubois d'Amiens—Messrs. Longet, Brown-Séquard, &c.—Messrs. John and Alexander Shaw—The ass, the ape, and the mimic—Goethe, botanist and physiologist—Professors Owen, Davy, Faraday, Whewell—*Lex Belliana*—Professor Lawrence—Essay on the forces of the circulation of the blood—Experiments in physiology—Vivisection—A sixth sense—The Bridgewater Treatises—On the hand—The Christian Advocate—Quintilian on the hand—The nervous circle—The cerebellum—Milton and the sense of sight—

Final causes—Dr. Chalmers—The telescope and the microscope . . . . . pp. 86 to 148

CHAPTER IV.

A retrospective page—Captain H. Kater—Plagiat—Messrs. Brown-Séquard and Alexander Walker—Disgusts and consolations—Sir Humphrey Davy, Sir F. Chantrey, John Wilson, and fishing—Sir Charles Bell's dog, Sir Astley Cooper's dog, and M. Magendie's dog—The mineralogist Haüy—The physiologist in the fields—The pupils of Sir Charles Bell and his colleagues on the same bench—Animal mechanism—Borelli and Bernouilli—Note on resurrection—Emoluments of a surgeon in London and Paris—The Guelphic order of knighthood—The boy on crutches—Return to Edinburgh—John Bell in Italy—Change of houses—Auld Reekie and the new town—Letters to Richardson and Fergusson—Lost illusions—Medical teaching in the three kingdoms—Bill for medical reform—Fit of misanthropy—Travels on the Continent—Sir Charles Bell in Paris—Messrs. Roux, Dupuytren, &c.—A breakfast to Sir Astley Cooper—Interview of the Author with Sir Charles Bell—Memoirs of Bourienne—Nervous habit of Napoleon the First—Pilgrimage of a physiological artist in Italy—The beards of the pioneers and saints—Italian expression—Catholicism and the arts—The statues of Michael Angelo, Moses, The Dying Gladiator, The Laocoon—Raphael and Domenichino—M. Ingres—Roman beauties—Simart and the Venus of the Capitol—Return to Scotland—Sir Isaac Newton and Sir Charles Bell—Last hours of Sir Charles Bell and Charles the Fifth—Moral of Sir Charles Bell's life . pp. 149 to 203

APPENDIX.

Science and Poetry—Newton's mental eclipses—contempt for the Fine Arts—Newton and the Apocalypse . . . 205
Biography of Professor Fages 207

PAGE

Medical Sketches—Classification of the medical profession—Dr. Pomme and vapours—Portraits of the Ludoviceum—Illustrations of the school of Montpellier—Professor Baumes—Dr. Portal and Cardinal Maury—Dr. Jenner, &c. 210

William Paterson 223

Charles Bell's friends—His opinions 224

Sir Astley Cooper, anatomist and physiognomist—His *coup-d'œil* 224

Date of publication of the new anatomy of the brain—Various memoirs contained in the nervous system—Hypotheses of Barthez on motion and sensibility—His conjectural physiology at Montpellier 227

Quotation completed and rectified (*erratum*) 229

A reminiscence of John Hunter 230

Voluntary omissions—Calculated speed of the nervous agent, 232

Recurrent sensibility—Lectures of Dr. Brown-Séquard . . 233

The transatlantic telegraph and nervous system in America . 235

Dr. Marshall Hall and reflective action 235

Influence of Charles Bell's physiology on philosophic language 236

Note upon Göethe, as botanist and physiologist 236

The eggs of the ant 238

On the circulation of the blood 238

The muscular sense, the cerebellum, the vital principle, &c. . 239

Medical fishermen 242

Professor Lordat and oral instruction 243

Professor Roux 245

Note on the philosophic anatomy of expression 246

Inspiration derived from the country 247

A reflection by Newton 248

Letter from Sydney Smith to Lady Bell 248

National distinctions between England, Scotland, and Ireland 249

Mr. G. H. Lewes and the British Association 249

SIR CHARLES BELL.

I HAVE been told that your labours are painful. Do not be either surprised or discouraged on that account; for the little good I have done is that which has cost me the greatest trouble, and has encountered the most numerous obstacles.

Letter from W. Hunter to his Colleagues of the Academy of Sciences in Paris.

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THE discovery of Sir Charles Bell on the functions of the nervous system is the most important fact which science owes to the physiologists of Great Britain, since the doctrine of Harvey on the circulation of the blood.

Harvey was born in 1578 ; Charles Bell in 1774. Harvey expounded the general mechanism of circulation to his pupils in 1619 ; Charles Bell, after publishing a small number of copies of his first treatise on the nervous system in 1811, explained the subject under the form of papers successively read to the Royal Society of London in 1821 and 1822. Two centuries separate the birth and respective discoveries of these two gifted men. Undoubtedly this interval has been filled up in England, and elsewhere, by labours which have enlightened the advances of physiology and pathology. To these labours illustrious names are attached ; in England, amongst others, those of the two Hunters. But in the history of these sciences every intermediate celebrity must yield precedence to Harvey and Charles Bell, the authors of the two greatest revelations made by modern physiology and anatomy in the material organization of our being.

There is a singular analogy in these two discoveries. After being rejected by routine, or, at least, admitted with suspicion, the honour of their paternity was subsequently claimed by plagiarists, or assigned through jealousy to those who had no right to it ; and biographers seeing how dearly

Bell and Harvey have paid for fame, and more inclined to pity than envy them, have asked themselves whether they should not be included in the martyrology of science by the side of Newton, Galileo, Kepler, and other illustrious men persecuted by their contemporaries.* Let us not, however, exaggerate the minor calamities of life. It seems to me, that if it be true that Harvey lost his practice in the city, the physician nevertheless was either enough of a philosopher, or sufficiently indemnified by fortune, to be able to console himself for his genius, since he died at eighty, and in good credit with the Court. Sir Charles

* Sir David Brewster has published a small volume containing the *Lives of Galileo, Kepler, and Tycho-Brahé*, under the common title of *Martyrs of Science.*

Even in the present day, M. Flourens would seem to detract from Harvey's fame when he says:—"When Harvey appeared, everything with regard to circulation had been indicated or suspected, but nothing settled."—"Yes," replies M. Milne-Edwards, "everything had been indicated or suspected, but nothing understood." In fact, if Michael Servetus had comprehended the circulation of the blood, he would never have imagined that the arteries, in terminating, become nerves; an arrangement which would have rendered all circulation impossible. And Cæsalpinus, who carried the heat of the arteries into the veins, concluded that the veins convey the blood to the liver and intestines.

See the *History of the Circulation of the Blood*, by M. Flourens, and *Lessons in the Comparative Physiology and Anatomy of Man and Animals*, delivered in the Faculty of Sciences at Paris, by M. H. Milne-Edwards, vol. iii. p. 3. M. Milne-Edwards agrees with Hunter in his system of *lacunal circulation.*

Bell received the honour of knighthood alone, and was not, like Harvey, first physician to two kings. If his correspondence, and a journal in which he entered his daily reflections, do not present us a man happy in the full measure of his success and reputation, let us frankly admit, not to check the ardour of the genius of discovery, that he might with more truth have attributed his occasional fits of despondency to his own temperament and character, rather than to one of those extreme acts of injustice of which the world is sometimes too prodigal towards superior minds. Be this as it may, amongst the most powerful charms of his biography is the study of the individual sentiments of one who so curiously analysed the secret springs of all human feeling. Thus, in sketching his various labours, we much prefer dwelling on what is positively known of his private correspondence, and the journal of his impressions. Our task is thereby rendered more easy. The full appreciation of such a man as Charles Bell demands the double talent of a writer and a scholar. We have no title to the undertaking beyond a lively sympathy for the celebrated physiologist, and the pleasure which age enjoys in sometimes returning to the forsaken studies of youth.

There are few countries whose physiognomy is more picturesque than that of Scotland; perhaps not a single people with a more decided nationality. Physically, they are well-formed, and endowed with vast intelligence, owing to a degree of education diffused amongst the lowest orders, and to a popular poetry cherished by the literary class, whatever may be its rank or condition. Whether clinging to the native soil or yielding to the nomadic impulse, which forms also an instinct of the race, you cannot meet a fellow-countryman of Wallace or Walter Scott, who is not invariably proud of his native land and its history. They all derive from this legitimate pride a sentiment of personal dignity, preserving, at the same time, the national type with its individual originality. It has been said of the Scotch, that they believe themselves all, more or less, gentlemen by birth; and the pretension explains itself by the ancient division of the Celtic population into clans or great feudal families, the most remote member of which bore the same name with the chief; but still more by the long wars sustained for the independence of the territory, in which every one could enumerate an ancestor who bore arms.* This pretension to

* John Home, author of the tragedy of *Douglas*, and of a

noble descent would degenerate into puerile vanity, if the Scotch were not an active and laborious race, still more and justly celebrated by their aptitude to win distinction, either in the liberal arts, or by manual industry. No country, the extent of its population considered, has supplied a greater number of intelligent minds at once inventive and persevering, sagacious and enthusiastic. Accommodating itself to all the successive modifications of social and political life, the genius of the Scotch has been signalized in all periods of history by opposite manifestations. The Middle Age owes to it some of its saints and pre-eminent disputants. When the sixteenth century awakened the spirit of inquiry, in conjunction with the love of classical study, Scotland produced John Knox, the Reformer, who acted a part equal to that of Luther; and Buchanan, a poet, historian, critic and controversialist, who may walk by the side of Erasmus.

History of the Rebellion of 1745, was the son of an humble office-clerk, residing in a small cottage near Ancrum, Roxburghshire. Nevertheless he claimed common hereditary descent with the Earl of Home. Sir W. Scott justifies the anxiety of the Scotch on the subject of genealogy, by observing that this ancestral worship has often been rewarded by an unexpected inheritance in a country where, from the system of entail, chance has more than once restored to the highest step of the social ladder an obscure individual who had no access to fortune left beyond his name.

When the destinies of Scotland became politically associated with those of England, which country received from her a new dynasty, we often find the councils and armies of both kingdoms directed by Scotch statesmen and generals. At a later period the religious influence of the successors of John Knox governed the spirit of the republican revolution of England. Cromwell himself only vanquished the resistance he encountered on the opposite bank of the Tweed, by the energy of the principle which had there its original home; and when the re-action against the protectoral system exploded, and the restoration of the monarchy took place, the end was brought about by the co-operation of the army led by Monk from Edinburgh to London. The civil wars which preceded and followed the overthrow of the Stuarts, absorbed nearly all the leading men and minds of Scotland; but they brought out also in powerful relief some of the most eminent actors in that long historical drama, which ended in the complete abolition of the independence of the least populous of the two kingdoms, without effacing the stamp of its nationality. This impress survives, even to the present day, a more complete fusion. The abatement of the last regrets has served only to open a more

extensive arena to individual intelligence and collective activity, by the transmutation of the old parties, Jacobites and Roundheads, into modern Whigs and Tories. If we study the parliamentary annals of England since the battle of Culloden, we find a Scotchman alternately minister and leader of the opposition. In the army, the Scotch regiments turn the tide of several battles; and a Scotch general more than once wields the truncheon of command. Abroad, the commercial enterprise of the Scotch founds colonies, discovers islands, or perforates an isthmus to unite two continents; whilst at home, collective activity displays itself in the agricultural transformation of the soil, and the creation of new ports and manufacturing towns (Glasgow, Greenock, Dundee, &c.), capable of exciting the jealousy of Liverpool and Manchester, those great centres of English industry.

Thus sprang up an epoch of fermentation for all the characteristic energy of this people, whence emanated, towards the close of the eighteenth century or the commencement of the nineteenth, that new pleiad of daring theorists and practical spirits, metaphysicians and political economists, poets and critics, novelists and historians, engineers, mathematicians, chemists and physiologists,

nearly all contemporaneous — Adam Smith, Dugald Stewart, Robert Burns, Walter Scott, Jeffrey, Fergusson, James Watt, Telford, the two Hunters, Charles Bell, &c., &c. Each of these names recals a new school of æsthetics or literature, an ingenious system, or one of those teeming ideas which make a giant's step in the march of science.*

What these names remind us of, to the honour of the entire nation and in testimony of its intelligence, is, that in Scotland more than elsewhere, through the multiplication of elementary schools, natural capability finds the opportunity of developing and improving itself by study. Before he became an eminent mathematician, Fergusson was a simple shepherd; before he ripened to a poet, Burns was a labouring peasant; before he rose to be the great engineer, Telford was a mason's apprentice. The father of James Watt was too poor to dream of making his son anything but an artificer; and the parent of Charles Bell was the minister of a parish. But Scotland bestows grammatical instruction on all her children without charge, and natural aptitude does the rest. In a speech

* These illustrious examples of modern Scotland, however, have not cast into oblivion their predecessors—the Humes, Robertsons, Clerks of Eldin (*Naval Tactics*), Smolletts, &c.

lately delivered by Earl Stanhope to the students of Aberdeen, on his election as honorary rector of that university, he quoted to them two young shepherds who had laid aside their earnings through an entire summer to enable them to attend the winter classes in the college of Glasgow.*

A minister of the Church of Scotland, the Rev. Dr. Aiton, published, in 1842, a volume communicating what he calls the humble economical condition of his brethren; or rather, the low scale of their salaries, and the frugal life to which those are reduced who have no patrimonial fortune.† He personifies to a certain extent their rare merits as fathers of families, by the filial dedication of his work "To a Father, who, upon an annual income of at most one hundred pounds per annum, brought up a family of twelve children, of which five were sons, educated for liberal professions; and who has often sent his last shilling to them, by turns, while they were at college!"

The father of Charles Bell was another type, not

* The newspapers of this month (April) mentioned the analogous instance of an artisan who saved up six months' salary to attend the university during the winter.

† *Clerical Economies.* Dr. Aiton has also published an interesting account of his pilgrimage in the Holy Land, under the characteristic title of *The Countries of the Messiah, the Prophet (Mahomet), and the Pope.*

less admirable, of this family devotedness. A minister of the Episcopal sect, he performed the duties of the small curacy of Doun, in Monteath, with an annual salary of £25 (600 francs), and this income sufficed to procure an ample education for his three first sons. Robert, the eldest, rose until he was able to purchase the practice of a *Writer to the Signet* (a combination of the duties of notary and solicitor in France); John, the second, became the celebrated surgeon of Edinburgh; and the third, George Joseph, an advocate of superior talent, obtained the chair of Scottish Law in the university. Charles, the fourth, born in 1774,* the child of his father's old age, would have been, like the rest, the object of his sacrifices and his affection, but the worthy minister died before he whom he called his Benjamin was old enough to profit by them. Fortunately for the young Charles, he had still a mother, a woman also of heart and understanding. It was she who taught him to read, to write, and to cipher.

At an after period he wrote this note on the margin of a biographical summary of his career in a medical journal: "Nonsense! I received no edu-

* In the month of November. Bichat preceded him by three years, being born in 1771.

cation but from my mother; neither reading, writing, ciphering, nor anything else. My education was the example set me by my brothers; there was in all the members of my family a reliance on self—a true independence—and by imitation I obtained it. People prate about education, and put out of sight example, which is all in all."

Having lost his father at such an early age, Charles Bell not only received from his mother the elements of education, but also those first impressions of the child, which throughout the life of the man exercise their influence upon the judgment and imagination. This influence became the more powerful as it associated itself with veneration for his father's memory, and sufficed to account for the romantic and poetical tendencies of his character, which distinguished him from his brothers, whose example contributed also, beyond doubt, as he says, to give him, in an inferior degree, that love of personal independence he ascribes to the entire family.

The reverend clergyman, father of the four Bells, brought up in the rigid principles of Presbyterianism, had, in 1720, from conviction, joined the ministry of the Episcopal Church, the creed of the smaller number in the ancient kingdom of the

Stuarts, while at the same time he adopted Jacobite notions; generally those of the Episcopalians, as also of the Catholics, another minority. When Charles Bell became old enough to form his own ideas, the opinion of his father was little more than a sentiment in Scotland, consigned to history and poetry, and indulged in even by those who considered themselves more Whigs than Tories; as belonging to the opposition rather than to the ministerial party. We retrace this sentiment in the poems of Robert Burns and in the romances of Walter Scott. Charles Bell, the son of a Jacobite clergyman, fed his young imagination with these reminiscences, although the choice of his friendships rather classed him amongst the Whigs; as far as a man can be so classed with little eagerness to express a political bias, and already absorbed in his studies, his literary tastes, and his profession.

The widow of the good minister of Doun lived long enough to feel assured that the youngest of her children was well worthy of his elder brothers. Charles had too much natural affection, too tender an impression of his early infancy, not to declare willingly his gratitude to his mother; while at the same time he felt pleasure in bearing witness to

himself that he had justified her maternal solicitude by his conduct and success. This testimony his brother John addressed to him in presence of his brothers, by the side of their mother's death-bed.*

Nevertheless, Charles Bell was not one of those infant prodigies whose precocious achievements form the pride of their parents and teachers. His brothers placed him in the great elementary institution of Edinburgh, the local seminary called the *High School*, where he remained, rather behind than in advance of scholars of the same age. He modestly despaired of his own efforts in application, and inclined to think himself condemned to an industrial career, contrary to his ambition. He had no idea that even in the lowest benches of a class the child receives lessons which are sure to unfold themselves hereafter in his understanding. Memory wakes up at last, rich in tardy seed suddenly fertilized, and adorning with its flowers the summer, and sometimes even the winter, of life. Some of Charles Bell's school-

* "My mother was my only teacher. I hope I was a comfort to her. On her death-bed John said, 'Let it be a pleasure to you to reflect that you were always her consolation.' (Note by Sir Charles Bell on the margin of a biographical notice in the "Medical Gallery.")

fellows were, moreover, formidable competitors, if we may judge of their boyhood by the reputation they acquired before mature age. During the last years of the eighteenth century, the High School of Edinburgh sent into the literary world Walter Scott, Francis Jeffrey, Henry Brougham, Cockburn, Horner, and other names less known beyond the boundaries of Scotland. Amongst these future celebrities, some, it is true, had finished their classes a year or two before Charles Bell, and others entered school after him, only becoming his fellow-pupils in the higher degrees of the university. But neither Dr. Alexander Adam, nor his assistants, whose pedagogic sagacity has been eulogized in more than one biography, were able to divine his special vocation, when John Bell decided that his young brother knew enough of Greek and Latin to practise under his direction the manual department of surgery, and to attend at the same time the university lectures. It was thus that Charles Bell soon felt the circle of his ideas increase, while profiting not only by the fraternal lessons, but by those of several eminent professors, who were at that time endowed with the gift of exciting the enthusiasm of their young listeners. The most illustrious and influential amongst these, both by

his printed works and oral lectures, was Dugald Stewart, who in the land of David Hume, the sceptic, rekindled the light of spiritual philosophy, and whose doctrines have since led to a powerful reaction in France, as well as in England and Scotland. To explain these doctrines would be superfluous in a country where the "Scottish Philosophy" has successively found such interpreters as Royer-Collard, Cousin, Jouffroy, and Remusat. What is related of the oratorical power of Dugald Stewart by those who have been carried away by the charms of his discourse, may justly recal to the men of the present day the enthusiasm inspired in their listeners by some of those professors who, during the Restoration, maintained the sacred fire in the College of France and at the Sorbonne.* Lord Cockburn, in his posthumous memoirs, after eulogizing the musical

* I allude here especially to the professors from 1819 to 1829. Having since known them personally as the humble associate of one and the friend of all, while ever preserving the deference of a disciple towards his instructors, I delight in applying to them this sentence, borrowed from Dugald Stewart himself in his biography of Thomas Reid: "It is with a lively sentiment of respect and gratitude that I recal the names of those to whom I was indebted for my first attachment to these studies, and the happiness of a liberal occupation, far superior to the most ambitious dreams of political life."

fascination of Dugald Stewart's voice, his action so simple and elegant, although slightly academic, the care with which he rejected all approaches to theologistic controversy, the happiness of his literary and historical allusions, his indulgent, and at the same time elevated morality, &c., adds: "To me his lectures were like the opening of the heavens. I felt that I had a soul. His noble views, unfolded in glorious sentences, elevated me into a higher world. I was as much excited and charmed as any man of cultivated taste could be, who, after being ignorant of their existence, was admitted to all the glories of Milton, and Cicero, and Shakespeare. This changed my whole nature. In short, Dugald Stewart was one of the greatest of didactic orators. Had he lived in ancient times, his memory would have descended to us as that of one of the finest of the old eloquent sages. But his lot was better cast. Flourishing in an age which requires all the dignity of morals to counteract the tendencies of physical pursuits and political convulsions, he has exalted the character of his country and his generation. No intelligent pupil of his ever ceased to respect philosophy, or was ever false to his principles, without feeling the crime aggravated by the recollection of

the morality that Dugald Stewart had taught him."*

It is easy to divine the impression received by Charles Bell from the lessons of such a master; an impression which we trace in more than one passage of his *Treatise on the Hand*, and also in the commentary on Paley's *Natural Theology*, written in conjunction with Lord Brougham, one of his fellow-students in the University of Edinburgh. The works of Dugald Stewart cannot convey an idea of the enthusiasm excited by his oral lectures. In the latter he combined to a certain extent the orator and the actor. We know how much life and warmth the accent and emotion of speech can impart to thought, whether it springs from memory or sudden inspiration. I met in Edinburgh several auditors of the great philosopher, who retained the same remembrance of him with Lord Cockburn, and amongst others Dr. John Thomson, to whom I was introduced by Sir Charles Bell, his associate. Dr. Thomson told me that the two strongest impressions of his life were the tragic acting of the

* *Memoirs of Lord Cockburn.* See also *Memoirs and Correspondence of Lord Jeffrey.* A new biography of Dugald Stewart has been lately published by Mr. Veitch, a pupil of Professor Hamilton; it forms part of the tenth volume of the Professor's works, edited up to that period by himself.

celebrated Mrs. Siddons, and the oratorical delivery of Dugald Stewart. Sir James Mackintosh unhesitatingly compared his influence with the students of the northern Athens, to that of Socrates over the youths of Attica.

One of the chief advantages of this instruction, was to maintain the worship of a moral system unconnected with the great questions of social policy which the drama of the French Revolution suddenly excited in Scotland. These questions almost entirely absorbed men of mature age from 1789 to 1800; but Dugald Stewart retained always his youthful auditory, whom he dismissed with increased attention and added knowledge to the other professors his colleagues. These young disciples, in the interval of their classes, fed themselves still with elevated studies. Whatever might be his particular vocation, every pupil voluntarily dedicated some hours of his leisure to the cultivation of his understanding by varied lectures, until at length a day arrived when five or six followers of the illustrious master were found equal to the establishment of a Review which embraces nearly the entire range of human knowledge.

When Charles Bell commenced his studies in the healing art, the Faculty of Edinburgh pos-

sessed many eminent professors. The course of lectures which had the greatest attraction for the students was, beyond dispute, that of Dr. Black, called by Fourcroy the Nestor of chemical revolution, who perpetuated the traditional system of Dr. Cullen. His labours are familiar to all scientific men. His numerous pupils have highly extolled his easy elocution, pure pronunciation, graceful gesture, and phraseology always correct, harmonizing with the fine frilled linen and powdered periwig of a fashionable physician of the eighteenth century;—an irreproachable style, which threw out in stronger contrast that of his intimate friend, Hutton, the mineralogist, a true type of an original scholar, affecting the simplicity of a quaker. The chair of nosology was at that time filled by Dr. James Gregory, successor to his father, who possessed all the importance conferred by personal merit, when also hereditary and looked upon as a family privilege. The Gregories enumerate with much satisfaction sixteen professors of their name, who have filled the same number of chairs in the Universities of England and Scotland.* Dr. James Gregory, a man of the world, and a learned phy-

* The Professor Gregory, who died recently (May, 1856), was grandson of the contemporary of Charles Bell.

sician, was fond of controversy. Naturally lavish of irony, his style pleased the public more than it did his brethren. He never feared to be the aggressor, whether right or wrong; an alternative which occasions little embarrassment to disputants who, like himself, are sure of having the laughers on their side. His antagonist was usually John Bell, acknowledged to be the first surgeon, as Dr. Gregory was admitted to take the lead amongst the physicians, and equally eager in dispute. The Faculty of Edinburgh, beyond any other, may be quoted in support of those who apply to physicians as well as to philosophers and theologians the saying of the biblical prophet, *Tradidit mundum disputionibus eorum.** The two champions indulged freely in personalities; thus, one quarrel often contained the germ of a second, which as soon as the first was pacified, rapidly exploded in a new war. Charles Bell, in course of time, found himself dragged into this whirlpool of controversy, in which, faithful to his name, he distinguished himself, but sometimes, with an inward sigh when called upon to sacrifice his free judgment; for occasionally his brother, wounded by the arrows of his adversary, exceeded the proper dignity of the

* He has given over the world to their disputes.

doctoral gown, and in his authority of professor, affected from time to time those despotic formulas which the natural indocility of young students is apt to resist.*

A rivalry more profitable to science existed between the Professor of Anatomy in the University and John Bell, who was only a member of the College of Surgeons. Alexander Monro, the university professor, inherited with Dr. Gregory a name rendered illustrious by his father, who had not only founded this class, but had formed a private museum—a valuable property in his family at a time when it was still so difficult to procure "subjects." John Bell, handling with equal facility the pencil and the knife, and combining a double class of dissection and surgical operations, had opened a private amphitheatre, to which he drew a numerous auditory of students, attracted equally by his superiority as a professor and the insufficiency of the lessons, more theoretical than practical, in the lectures of the Faculty. There, also,

* We could readily quote from our own schools a counterpart to the controversies of John Bell and Dr. Gregory. We are struck by finding in the medical quarrels of Edinburgh the same sallies we had applauded as original in France, whether at Paris or at Montpellier, and which have been also ascribed as original to the wits of the Faculties of Great Britain.

prejudice, competition, and jealousy of privileges often excited an opposition against him which he long braved with the independence of his character and the vivacity of his language, backed by the admiration of his young disciples. Charles, speedily associated with his labours, and soon admitted as his substitute, felt justly proud of such a master, who, on his part, was delighted with the opportunity of bringing out in relief a duplicate of himself.* Having surmounted his early repugnance, he gave himself up to anatomy with the greater zeal as he combined with that study the art of drawing, a gift he had received from nature in common with his brother. Edinburgh possessed then a school of painting and several artists of a certain value; amongst others, David Allan, the first of that name, who was flattered, undoubtedly, by being called the Scottish Hogarth, but who seized with happy fidelity village physiognomy and comic types, of which we see evidence in his illustrations of the pastorals of Allan Ramsay, the barber-poet, who, in the popular literature of his country, is to Robert Burns or Walter Scott what David

* In his work on the nervous system, Charles Bell speaks with respect of Professor Monro, whose lectures he attended at the same time with those of his brother.

Allan is to Hogarth or Wilkie. David Allan had resided in Rome, and while there was presented to the grandson of James the Second. He visited the Bell family, and discoursed of Charles Edward with the old Jacobite minister, and of the fine arts with his children. "I remember him," says Charles Bell, in one of his works, "as a facetious old gentleman, who lent me models to copy, and called me his young brother brush."* The accounts given by David Allan to the two brothers of the wonders with which ancient and modern art have successively decorated Papal Rome, made them often dream of that pilgrimage to the immortal city which each was destined to realize at a later period. Both equally conceived and executed as artists their anatomical figures. Charles, still a pupil, published a *System* or *Manual of Dissection*, with plates engraved after his own designs. John entrusted to him the description of the nervous system for his work on the *Anatomy of the Human Body*, published in successive volumes from 1794 to 1800; a date when our Bichat, in France, preluded, also, the publication of his *General Anatomy* by his *Treatise on the Membranes*, and his fine work *On Life and Death*.

* See the *Anatomy of Expression*, note to p. 17, 4th edition.

On the 1st of August, 1799, Charles Bell, having completed his term as student, was admitted a member of the College of Surgeons, and, in this quality, was enabled to perform, in the royal hospital of the city, various operations, which showed that, like his master, he was equally skilful as a surgeon and anatomist. He also profited by his clinical experience to improve another talent, that of modelling pathological cases in wax, and formed a collection for himself, of which some remarkable specimens are still to be seen in the museum of the College of Surgeons at Edinburgh.

But already a sort of conspiracy was brewing to exclude the two brothers from clinical practice. James Gregory, who trimmed his pen for this new controversy, had such sound arguments on his side, that he might have abstained from seasoning them with the Attic salt, of which he was never more profuse. The medical service of the hospital had been from time immemorial confided to all the members of the two colleges, Physicians and Surgeons, who relieved each other monthly in regular order. Dr. Gregory had no difficulty in showing that, in consequence of the varieties of doctrine and practice, the patients were constantly handed over from one mode of treatment to

another, with the chance of being physicked or bled, according to the opposite systems of Hippocrates or Galen ; sometimes even the mere spirit of caprice or contradiction being the sole motive for these vicissitudes of regimen and therapeutics. The members of both colleges, particularly those who had private classes, defended the custom and their acquired rights with all the argumentative weapons of logic, foreseeing well that the nomination of three or four permanent practitioners would virtually exclude the rest, and probably the most able. They were beaten, however, and neither John nor Charles Bell were appointed. John gave vent to his ill-humour by shutting up his class. Charles, who was anxious to complete his pathological studies and his collection of models, offered to pay one hundred guineas and to present his Museum of Anatomy to the Faculty if they would only allow him to be present at the autopsies performed in the amphitheatre of the hospital, and to make drawings of every remarkable case.* This was refused. From that moment,

* In a work published at Paris, in 1820, I pointed out the great talent of Charles Bell in modelling anatomical subjects in wax, after the manner of Dr. John Cross. At that date I said nothing of his grand discovery, for I was unacquainted with it, and it was still generally unknown in Paris as in London.

although he continued his private lectures, he naturally participated in the vexation of his brother, and contemplated seeking, sooner or later, in a larger theatre a more sympathetic public, at the risk of encountering even a more disloyal competition than he had met with in Edinburgh, and friends less intimate than his schoolfellows.

Of these friends, the most warmly attached was his third brother, Joseph George, the advocate, not less distinguished than the other two by rare intelligence, but nearer to himself in age. George and Charles could frankly confide to each other all their thoughts, their past deceptions, their dreams for the future, reciprocally freed from that restraint, so salutary in many respects, imposed by elders on their juniors, and invested with double authority when they are our masters and representatives of one common father. A memorandum of George's, quoted by Lord Cockburn, describes them both going together to visit an old aunt who lived twenty-two miles from Edinburgh, and discoursing a little about everything, like young peripatetics, during the journey. George had sketched the first elements of a work on law, still wanting to jurisprudence; and Charles was meditating that noble treatise on anatomy for the use of painters which

was also a desideratum both for science and art. "I remember," writes George, "that we halted to rest ourselves on the bank of a small stream. There we enjoyed happiness in anticipation while saying to each other how delightful it would be at some future day, to recal these first steps in the world when we had mounted a little higher." A natural and charming picture of two brothers who thus commence the voyage of life, quench their thirst in the clear water of the brook, yield themselves up to an innocent ambition, and believe in certain success, under the sweet confidence of mutual wishes! Such a reminiscence has its charms, even for those who have not reached the proposed goal. The two brothers were both destined to attain theirs.

George had more practical philosophy than Charles. We read again, in the Life of Jeffrey,* that he often raised the courage of the future Aristarchus of literature, when the latter felt tempted to renounce the profession of the bar, so slowly did his clients come in. Jeffrey was the friend of the two brothers, and was as fond of talking painting and anatomy with Charles as jurisprudence with

* *Life and Correspondence of Lord Jeffrey.* By Lord Cockburn.

George ; that brilliant spirit had the same aptitude for science as for art and literature. John Allan, John Thomson, Thomas Brown, John and Charles Bell, adepts of the medical Faculty, attracted him no less than the aspiring tyros of the Edinburgh bar, Cockburn, Brougham, Murray, Horner, and Richardson ; or the young eagles of poetry and literature, Walter Scott, J. Grahame, Sydney Smith, &c., whose editorial association founded the celebrated Review.

The friends of Jeffrey were nearly all the friends also of Charles Bell, and their eminent names sufficiently proclaim the atmosphere of science, art, and poetry in which he lived from 1794 to 1804.

Edinburgh, although deprived for two centuries of the royal crown, preserved still some of the attributes of a capital. It was not entirely deserted by the ancient nobility. It was the seat of one of the high judicial courts of Scotland, and of the Presbyterian Synod, whose annual sessions constitute a sort of ecclesiastical parliament. Its university maintained a centre of intelligence, which cast its beams on England itself, as much as Oxford or Cambridge did. Edinburgh had a *season* like London, an epoch of festivals, routs, and balls, which united all the different aristocracies ; the castles

sent their nobles to this congress, scholars transformed themselves there into men of fashion, every celebrity yielding precedence to woman, the queen of the drawing-room. Fashionable gossip, which never gives up an epigram, pretended that the ladies of Edinburgh, to render themselves more certainly agreeable to the learned philosophers, the judges, professors, theologians, physicians, and advocates, might have supplied a Scotch Molière with some varieties of the character of Philaminte. The ingenious Sydney Smith, the philosophising ecclesiastic, has made himself the indiscreet echo of this exaggerated criticism, at which the surviving dowagers smile, who still remember the gravity of their youth, and the admiration they extracted from the most erudite members of the university, while executing their *strathspeys*, *jigs*, *reels*, and other national dances.* Unfortunately there is something beyond metaphysics that can penetrate into a ball-room—the spirit of party politics, that great dissolvent of the social bond. From 1789 to 1806, the

* "The Scotch," said Sydney Smith, in one of his humorous sallies, "are so imbued with metaphysics, that they even make love metaphysically. I overheard a young lady of my acquaintance, at a dance in Edinburgh, exclaim, in a sudden pause of the music, 'What you say, my lord, is very true of love in *the abstract*, but ——' Here the fiddlers began fiddling furiously, and the rest was lost."—*Life of Sydney Smith*, vol. i. p. 15.

Whigs and Tories came more than once into collision in Edinburgh. The French Revolution became the fatal text of their disputes, until, after the rupture of the peace of Amiens, the threat of an invasion allayed these discords. A fit of warlike nationality, imported from London by Lord Melville, transformed into volunteers for the militia, professors and students, philosophers and dandies, judges and advocates. We read in the Memoirs of Walter Scott,* how, with the ardour of a feudal knight, he forgot his lameness to mount his charger, and drill his troop in the broadsword exercise. When the legal gown was unfolded it disclosed a uniform; and the Lord President Hope issued daily orders signed *Hope, Lieutenant-Colonel.* Lord Brougham enrolled himself as a private artilleryman, with the mathematician Playfair: Thomas Brown, the metaphysician, Grahame, the religious poet, Horner, the political economist, Jeffrey, the critic, Dr. Gregory, Charles Bell, &c., &c., marked time in the same battalion.

Previous to this date, Jeffrey and Sydney Smith had founded the *Edinburgh Review,* which, suddenly rising to the rank of a literary and political authority under the ensign of the Whigs, never

* Published by his son-in-law, J. G. Lockhart.

suffered itself to be carried away in the warmth of patriotic enthusiasm enunciated by the Tory party, and continued to assert the privileges of the pen over those of the sword. The editors of the *Review* were all friends of Charles Bell; but their influence, which even to 1806 was only that of a minority, was unable to aid him in his exclusively scientific ambition. In 1804, therefore, he finally resolved to seek his fortune in London, whither he had been preceded by some of the associates of Jeffrey, who, writing to Horner, in a letter dated November 4, 1804, says: "All the world migrates towards London. My good friend Charles Bell is about to follow your bad example; he has almost determined to fly and establish himself in the great asylum. I have a warm regard and esteem for him. I can also assure you that you will find him extremely unassuming, intelligent, honourable, grateful," &c.*

According to this anticipatory introduction, it would seem that Horner, one of the most eminent spirits of their common country, had not then been as closely connected with Charles Bell as with his brother George, and that their friendship only became intimate after they met in London.

* *Life of Jeffrey*, by Lord Cockburn. Vol. i.

CHAPTER II.

Arrival in London—1804—Isolation—Rivalries between England and Scotland—Lord Melville—Pitt—Lord Bute—Wilkes—Samuel Johnson—The new Timon—The two Hunters—Lord Macaulay—Dr. Baillie and Dr. Gregory—Sir Astley Cooper—Sir Joseph Banks—Galleries of the fine arts—Essay on the Anatomy of Expression—Criticism by Jeffrey—M. Cousin and the Spiritualistic school—Lavater, Descartes, Cureau de La Chambre, Hogarth, Reynolds, &c.—Shakespeare and Mrs. Siddons—The Scotchman denounced—Cline, Abernethy, Wilkie, &c.—Attempt to obtain a chair—Private class of Sir Charles Bell—The house in Leicester-street—The invisible girl—Sir Astley and the resurrectionists—The new anatomy of the brain—Want of encouragement—Haslar Hospital and military surgery—Letters to George Bell—Delirium—Marriage of Charles Bell—Letter from Jeffrey—The Hunterian school—The Middlesex Hospital—The College of Physicians in London—Excessive sensibility—Waterloo—Mont St. Jean—Napoleon and Macbeth—Letter from Brussels—Walter Scott—Letter from Ostend—A suicide—Letter to Francis Horner—Rich clients—First memoir upon the distinction between nerves of motion and nerves of feeling—A moment of triumph.

CHARLES BELL arrived in London towards the end of 1804. Thirty years of age, with a full consciousness of his extensive studies, having practised for several years, at first under the auspices of his brother, and subsequently as an independent pro-

fessor, he could present himself everywhere with modest confidence, if not with boldness. But, it seems that, betrayed by his early impressions, he was more timid than daring. London is an immense theatre when compared to Edinburgh. Charles Bell experienced there the sadness of isolation, in finding himself poor, unknown, and *a Scotchman*.

National distinctions still survive the general conviction that the two countries and nations have equally gained by the union of the two crowns and kingdoms. Englishmen and Scotchmen have too long been governed by opposing interests not to preserve some mutual prejudices; they resemble reconciled brothers, who on certain occasions have returns of their old jealousy. The Government has no longer anything to fear from these disputes. Religious antipathies are sufficiently calmed down, although even yesterday a large party in the Presbyterian Church preferred a schism to either the direct or indirect intervention of the State. There exists not between Scotland and England, as between England and Ireland, the wrongs of the conqueror and his victim, of the oppressor and the oppressed. The soil in Scotland belongs to the old proprietors; the privileges and revenues of the Church are

not confiscated for the worship of the minority over that of the majority. Nevertheless, there is rather union than fusion, and the Scotch who seek their fortunes in England, are sometimes compelled to acknowledge that their origin is a drawback which calls for a persevering struggle. We recognise the historic rivalry of the two nations in more than one biography.

In 1804, in the higher region of politics, animosity against the encroachments of Scotch ambition was justly awakened by the great influence of Henry Dundas, created Lord Melville, who was not premier, as his countryman Lord Bute had formerly been, but who scarcely acknowledged any superior except Mr. Pitt,—"his polar star," as he called him, when speaking of that great minister. When the pamphleteers had exhausted their flow of invective, they had recourse to the forgotten extravagancies of Samuel Johnson the unsparing satires of Churchill, and the diatribes of Wilkes. Such a host of charges were levied against this statesman, that he found himself accused of peculation, and compelled to resign all his employments. His acquittal by a large majority replaced him in the Privy Council, but his reign was over, and he retired to die in Scotland, where

he had many enemies, but not one of whom had ever suspected his integrity.*

Nevertheless the unpopularity of Lord Melville did not prevent several of his distinguished countrymen from pushing their way to the judicial benches, at the bar, and in the House of Commons. A Murray sat upon the woolsack in the House of Lords; James Mackintosh, created a baronet, was sent to India to fill one of those high offices which enabled him to return to England in a few years with an independent fortune;† Francis Horner was also able to choose between a place and a seat in Parliament by adopting the motto of Burke, *Nitor in adversum.*

Finally, in the medical sciences, several of Charles Bell's countrymen proved to him that it was possible, either as regarded their brethren or their patients, to triumph over the antipathy entertained against the Scotch.

* In an anonymous satire, of which Sir Edward Bulwer Lytton has acknowledged himself the author, one of the characters is identified by these lines:—

"Scapin to serve and Machiavel to plot,
Red-hair'd, thin-lipp'd, sly, supple, and a—Scot."

† Following the same political path, Mr. Macaulay became successively editor of the *Edinburgh Review*, a member of Parliament, a functionary in India, and a Cabinet Minister. Finally, he reached the House of Lords.

The two brothers Hunter were dead, but they left a nephew, Dr. Baillie, who, well trained in the same system, had acquired a reputation almost equal to theirs, a handsome fortune, and the honour of being physician to the Court. A member of several learned societies, a professor and author, he required no additional title, and being placed above rivalry, had religiously preserved his veneration for his native land. At the same time obliging to all, unassuming even to simplicity, although too true a Scotchman to abdicate his right of retort when attacked, and ever ready, if occasion required, to oppose a repartee to an epigram, even though aimed at him by a fellow-countryman. Dr. Gregory, on a visit to London, thought it right to call upon Dr. Baillie. He was asked what he thought of this illustrious brother. Perhaps Dr. Gregory, who piqued himself on his universality, had found Baillie below his own standard. "He is a great physician," replied he, "who knows nothing but physic." This was reported to Baillie, who retorted, "Dr. Gregory knows everything, including even a slight acquaintance with physic." This anecdote reminds me that when I was a student at Montpellier, there was a tradition that the great Barthez, who also knew

everything, provoked a similar rejoinder at his own expense. Sir Astley Cooper spoke more appropriately of Dr. Baillie. "Matthew Baillie," said he, "was remarkable for his kindness to every member of the profession, and, above all, to young practitioners. He knew that he had only to frown to chill their hopes, or to utter a contemptuous speech to work their ruin. But not a word of censure upon them ever passed his lips: thus they had no dread of his seeing their patients when they might be absent. He was not one of those assassins who offer you one hand in friendship, while they stab you in the back with the other. His integrity was not less remarkable than his good nature, and candour formed one of the prominent features of his character. It is to his profound researches into pathologic anatomy, assisted by extensive practice, that English medicine owes its scientific progress in our time."

Charles Bell was most cordially received by Dr. Baillie, but he could scarcely expect that he would supply him with a connexion. He found an equally obliging acquaintance in Sir Astley Cooper, who had formerly studied in Edinburgh with John Bell. If, in 1804, Sir Astley had not yet reached his destined pre-eminence, it might have been safely

predicted, when looking on that penetrating and intelligent eye, that boldness, dexterity, grace, and all the other qualities of the operator, joined to fluency of speech, an extraordinary memory, and all the attractions of physical beauty. He embodied a glorious type of the Anglo-Saxon race, and if he had had to describe to his pupils from a living sample the muscles of the calf, he might justly have extended a leg upon the table, capable of exciting the jealousy even of the Prince Regent, though he fancied himself a crowned Antinous.* His master, Cline, had resigned to him a portion of his early connexion—the City merchants—that he might establish a second in the aristocratic quarter of the West End. The clinical practice of Guy's Hospital had been entrusted to him, but it was quite insufficient for the feverish activity which possesses physicians and surgeons when once they rise into repute. But the surgeon, Astley Cooper, could no more secure a patient or a pupil to Charles Bell, than could the physicians, Matthew Baillie, Maton, or Lynn, to whom he was equally recommended.

Thus, in the midst of the noise and agitation

* The celebrated painting of George IV. seated on a sofa, by Sir T. Lawrence, familiar to all in the engravings, was the only portrait he ever sat for in which his own legs are introduced. —*Translator's Note.*

of London, notwithstanding the letters with which he had been provided, and which saved him the trouble of announcing his name, the voluntary exile of Edinburgh soon experienced the vacuum of solitude, as is sufficiently expressed in the monologues of his journal.

"I could see that much could be done—but where to begin? Where find a resting-place? How show my capacity of teaching or illustrating my profession? These days of misery greatly tended to fortify me, so that nothing could afterwards come amiss, or bring me to a condition of suffering equal to what I then endured. A little romance tinctured the whole; for I felt I was such an outcast from the society I loved and thought I deserved—so alone in the world—that I was sure some connexion was to be formed; and I entertained myself with fancies as to what family, what place, what set of people, it was likely Providence would unite me to. There was scarcely a street or a house in which my imagination did not lead me to think of the probability of finding a home at some future period. In that I was as romantic as any young man could be, though the prevailing cast of my mind was to gain celebrity and independence by science, and perhaps this was the most extravagant fancy of all."

It was not, therefore, those common-place attentions usually consequent on letters of introduction that Charles Bell sought for. He wanted a friend to replace his brothers, or an affectionate protector. This double requirement of his heart and ambition rendered him fastidious; for he had, in addition, his full share of national susceptibility. This feeling exhibits itself in what he relates of his first interview with Sir Joseph Banks, who had been the Mecænas of so many aspiring scholars, English and foreign.

"30th Nov., 1804.—I breakfasted with Sir Joseph Banks. He is in good style, but has a set of the absurdest animals, living animals—German and French toad-eaters—about him. There came in presently two old ladies, and a respectable, fresh-looking, gouty old gentleman, whom I took for the knight, and was angry with myself for coming to put myself in the train of this stupid, unmannerly man—unmannerly *quà* Sir Joseph, because he took no particular notice of me. The gentleman was a guest like myself, which when I knew, I saw him through a different medium. Presently the knight made his appearance, a very kingly figure of an old man, with a blazing star on his breast. He received my infirmary paper from

Dr. Garthshore, and sat down and read it before he took his breakfast. He spoke highly of it, and gave me a general invitation."

During this interval of expectation, Charles Bell profited by his involuntary leisure to visit the treasures of sculpture and painting scattered through the private galleries of London, and which, collected under one building, would form a museum rivalling that of the Vatican or the Louvre. In this particular, recognising London as the true capital of the three kingdoms, he regretted somewhat less the picturesque physiognomy of Edinburgh. While waiting for an opportunity to re-open his surgical case he took up his pencil again, and as reminiscences to his friends in his native city, he sent them several drawings. He completed also the plates for his *Treatise on Anatomy for the Use of Painters*, which he had brought with him in manuscript, and was now preparing for the press. A year passed thus—a year of frugal expenditure, the end of which he was unable to reach without having recourse to the purse of his brother George. After repeated applications, he at last found a publisher, and determined to announce a private course of anatomy, strongly hoping that the appearance of

his book would draw to his lectures, not only students in surgery, but in painting also. In Edinburgh, he numbered as many as eighty-six: in London, it took him an entire year to exceed three, which seemed to him a fatal figure.

Charles Bell's work appeared under the title of *An Essay on the Anatomy of Expression in Painting;* a title subsequently modified when the frame became enlarged in subsequent editions. The first was a quarto volume of 186 pages. The *Edinburgh Review,* then in its fifth year, noticed it, and Jeffrey himself wrote the article. Jeffrey fortunately remembered that he was the friend and countryman of the author. He might have been more severe; he who placed criticism above all other considerations, and carried away by that instinct as irresistible with certain journalists as cruelty in particular birds of prey, spared neither the feelings of the solemn Wordsworth nor of the jovial Thomas Moore, the aristocratic pride of Lord Byron in his juvenile efforts, nor the guileless confidence of his friend Walter Scott in his third poem. He set forth his qualified strictures, as he had a right to do, but he brought out in relief the merits rather than the imperfections of the book; and Charles Bell proved himself worthy of this

friendly judgment by incessantly labouring to improve his work, which a less indulgent review might have induced him to abandon.

Jeffrey began by admitting the utility of the book, which he ranked above the two analogous treatises of the celebrated Lebrun,* and the *Anatomy of Painters* of Dr. Brisbane. "Charles Bell," he added, "has not only given fresh evidence of his profound science as a surgeon and anatomist, but also of the most exquisite taste and feeling for sculpture and painting; a taste and feeling not always discovered in artists themselves. He has, moreover, found an opportunity of scattering through his work many traits of delicate sensibility and exalted morality. But in classical allusions, he imparts a higher authority to his lessons by invoking the aid of a religious philosophy too much neglected by proficients in the art."

These praises were the just recompence of a youth passed under the discipline of such a master as John Bell, and of the elevating emotions which the student had sought and found in the cultivation of the fine arts, or at the foot of the Univer-

* *Discourses on the Expression of the Different Characters and Passions.—Treatise on Physiognomy;* or, Analogy between the Physiognomy of Man and Animals. In folio, ornamented with fifty-six plates.

sity chair of Dugald Stewart. There was something better, in fact, in the first edition of his *Anatomy for the Use of Painters*, than a material analysis of the characteristic organs of man and animals—better than a mere description of the muscles, and a criticism on the purely academic teaching of schools of design. The spiritual physiologist analysed also all the emotions and sentiments which give life to physiognomy. He sought for the true *beau ideal* in the relations which the soul maintains with God and nature. "No particular faculty of the soul," says Charles Bell, "has been given to man without opening a vast field for the exercise of all. His intelligence, thoughts, and affections have their counterparts or objects created to excite or satisfy them. The soul loves to contemplate superior beings to ourselves, and in a condition of existence different from our own. Even in our enjoyment of what seems to us beautiful, our thoughts elevate themselves to something higher. We walk in the country, through woods and over moorlands, in love with nature and charmed with solitude. But, if we examine our thoughts, we shall find that we seek to people that solitude. Vainly do we persuade ourselves that it is nature and inanimate creation that delight us.

All may be referred to an interior reflection of the human voice and features." A little further on, we could fancy we are reading a page of M. Cousin on *Intuitive Reason*, where Charles Bell says again, "As the Creator has established this connexion between the soul and external nature, He has also implanted or engendered in us various intellectual faculties of a higher order. In every intelligent being He has placed a source of emotions which depict *Him* to us, of attributes which draw us towards Him, and repose in Him as that object. In the mind of the most ignorant slave abandoned to the impressions of surrounding elements, there still springs up a sentiment which leads him to the idea of a father and Creator. These feelings are spontaneous, universal, unalterable; nothing is better suited to demonstrate to us the adaptation of the soul to the different conditions in which man is placed. Nothing tends more to give us a conception of the Author of our being, and to inspire us with esteem for ourselves as being allied to HIM."*

* I have not now before me the text of the passage in which M. Cousin analysed *reason* as a revelation made to man by Divinity; as the moral light which will illumine the eyes of the soul, whether we desire it or not, just as the material light irradiates the eyes of the infant as soon as they are opened. "Reason," says M. Cousin,

With such a guide for the study of organic life, as well as for that of the imitative arts, can we fear being bewildered either in the doctrines of a materialistic physiology or in a sensual adoration of masterpieces extracted from the quarry by the chisel, or impressed by the pencil upon animated cloth? Before writing, Charles Bell had consulted Lavater,* Descartes,†, Cureau de La Chambre,‡ and also Lebrun; but his theories are all based upon personal observation, and his designs are the produce of his own pencil. As a critic on the fine arts, although acquainted with the treatise of Hogarth, and the discourses of Sir Joshua Reynolds, his doctrines are his own.

When I say with Jeffrey that the work of

"has no personality. It is no more my reason or truth than yours. The individual, the *ego*, the *me*, is will; will is the free arbiter, the liberty of choice for or against the inspirations of reason."

* *Essays on Physiognomy.* Lavater calls the science of expression, *Pathognomy.*

† *Treatise on the Passions.*

‡ *Characters of the Passions*, by Marin Cureau, of La Chambre, published in 18mo, Amsterdam, 1658. The distinguishing feature of Sir Charles Bell's theory is, that he was the first to demonstrate how the affections of the soul act at first upon the heart, and thus, by means of the respiratory nerves, produce *expression* by a certain reaction in the features of the face. See a note in the *Westminster Review*, August, 1844. The third edition of the *Anatomy of Expression* did not appear until 1844, after the death of Sir Charles Bell. The date of the second is 1824.

Charles Bell recommends itself to artists, I include in the latter term, not only painters and sculptors, but dramatic artists also, who illustrate expressive anatomy, painting, and sculpture in action. It is to them we must apply what Charles Bell says of the various expressions of the eye from menace to prayer,* or rather the definition of the peculiar sensibility of the heart, and the part in its reaction belonging to the physiognomic mask. No one could analyse like Charles Bell these external signs independent of will, and which he attributes to the play of the respiratory nerves. He shows us a murderer who, by a violent effort, conceals his intentions under a sardonic smile, and by attempting some horrible joke; but the effort betrays itself in the contraction of his features, and the natural pallor which strikes the Duke of Clarence in Shakespeare, when he says to one of the executioners sent by his brother Gloster—

CLAR.—Thy voice is thunder, but thy looks are humble.
MURD.—My voice is now the king's, my looks mine own.
CLAR.—How darkly and how deadly dost thou speak!
Your eyes do menace me. *Why look you pale?*†

From Shakespeare, Charles Bell, by a natural

* "Prayer is the upward glancing of an eye,
When none but God is near."—*Montgomery.*

† *Richard III.*, act i. sc. 4.

transition, passes to Mrs. Siddons, and after having said how far the interpreter of the tragic passions should exhibit their intensity to the public, he relates the effect produced by that honoured sister of the Kembles in the part of Catherine of Arragon. When the impressive scene came on in which the divorced Queen falls asleep to the sound of the music she calls her *knell*,* the multitude of spectators, of different sexes, ages, habits, and education, soon amalgamated themselves into a single soul, and by sympathetic silence attested the truth of the mute acting of the unrivalled artist. "Who taught them," asks Charles Bell, "that those weak tremblings, that composed smile, those slight convulsions of the muscles of the face, were the expression of nature herself?"

We shall return to this work of Charles Bell, remodelled in a fourth edition, enriched with notes of his travels in Italy; but it is proper to point out that it already contained the elements of his great discovery, in the analysis he gave of those nerves denominated by him the *respiratory apparatus*, the most important agents in the expression of the passions.

The success of the *Essay on the Anatomy of*

* *Henry VIII.*, act iv. sc. 2.

Expression in Painting was slowly acknowledged by the public; but the book at once gave the author a position with his brethren in London. It also excited jealous opponents, who denounced this meddling Scotchman, who came, they said, after the usual practice of his countrymen, to interfere with and supplant his predecessors. A fragment of a letter to his brother tells us how he was attacked.

"When I got into Lynn's carriage to-day, 'Bell,' said he, 'I wanted to speak and laugh with you. We have got scent of you—they are looking sharp after you. Damn it, sir, they think you are going to knock us all out; your book has been seen on Sir Joseph Banks's table.' Would you believe it, my dear George, somebody speaking of me to Lynn, said I was a sharp, insinuating young man, who would wheedle him out of his hospital? Lynn's answer was, 'How the devil will he contrive to do that?' They have a perfect horror here of the shrewdness and perseverance of Scotchmen."

Fortunately, however, *horror* of the Scotch did not embroil Charles with the magnates of medicine and surgery. He tells us in his journal that, on the contrary, he became more closely allied to

Cline, Cooper, and Abernethy. His work caused him to be particularly courted by artists, some of whom, and amongst others, his countryman, David Wilkie, determined to take lessons from him in anatomy. His detractors then found it necessary to support their opinion. One of his pupils, who afterwards rose to distinction, and became a member of the Royal Academy of Painting, inspired him with the lawful ambition of filling the anatomical chair. Vacancies occurred thrice, and each time Charles Bell, with his book in his hand, canvassed the parties on whom the election depended. Competition was on the alert. Three successive candidates obtained the preference, not one of whom had published an *Anatomy of Expression in Painting,* or happened to be an *intriguing* Scotchman. He was thus compelled to content himself with giving private lessons, and in endeavouring to establish another claim; and the more so, that his work, although appreciated by anatomists and painters, obtained, as we have said, but a very dilatory sale.

Here were grounds for despairing of the future, and assuredly desponding ideas might sometimes cross the mind of Charles Bell in the strange

mansion chance had given him for his school and residence.

It was an old dilapidated house in Leicester Street, which disappeared in 1844, with the greater number of those lately forming in that quarter such a curious labyrinth of passages and lanes. The first night he slept in it, while stepping into bed, the floor gave way under the weight of his body, and he thought himself fortunate when, on awaking the next morning, he found himself still on the first floor. "I would rather have nine children laid to my charge," said a surveyor whom he consulted, in a coarse, familiar manner, "than this house over my head." On examining the planks, they discovered a mysterious kind of tube or conduit, the use of which the architect was unable to divine. A neighbour informed them that the dwelling had recently been inhabited by the *Invisible Girl*, a species of phenomenon who had enriched herself at the expense of the credulous Cockneys. Charles Bell accommodated himself as well as he could in this ruin. It will readily be believed that the *subjects* introduced by the professor for his anatomical demonstrations soon gave an additional notoriety to the house, where the *Invisible Girl* became transformed into the appa-

rition of a beautiful young lady who had suffered dissection under the surgeon's scalpel before life was extinct. To the real history of Charles Bell's house, an American physician, William Gibson, in his *Rambles in Europe*, adds a veritable tale, which he pretends to have received from the pupils of Leicester Street (amongst whom he was included) as an authentic tradition. "Bell's servants," says he, "left him, one by one, almost as soon as they came; his house pupils dreaded sleeping in single rooms, or near the amphitheatre; and Bell himself, one night, while tossing about half asleep, felt his foot seized by an ice-cold hand."*

Charles Bell says, in the journal of his daily im-

* Dr. Gibson transcribed also *The Pathetic Ballad of the Invisible Girl* (Mary's Ghost), who thus relates her posthumous misfortunes to her lover:—

"The body-snatchers, they have come,
And made a snatch at me;
'Tis very hard them kind of men
Won't let a body be.

"The cock it crows—I must be gone—
My William, we must part;
But I'll be yours in death, although
Sir Astley has my heart."

The *Quarterly Review* (No. cxliii.), while quoting the tradition and the rhymes, remarked, with reason, a chronological error in the ballad. Astley Cooper was not created a baronet until twenty years after the misfortunes of the *Invisible Girl*.

pressions, "A man brought up, as I had been, in Scotland, has certain notions of respectability which are very strong and peculiar. I do not know that at any time I was more depressed than when I found the sort of house I owned." But could a professor of anatomy have easily obtained a more convenient dwelling in London at that time? In any quarter in which he opened his school must he not have been prepared to evoke spectres and ghosts, or at least to give rise to terrible or melancholy tales, of which he himself would be the hero? Before the Act of Parliament on *dissection*, which dates only a few years back, the anatomists of England and Scotland had to contend with the same prejudices to which their predecessors of the Middle Ages were exposed, and were reduced to the most lamentable expedients to obtain the subjects necessary for their lectures. The interval between 1806 and the passing of the Bill, witnessed, both in London and Edinburgh, a regular succession of resurrectionists and stranglers, those gloomy desecrators of the grave, those relentless Thugs of science, of whom the surgeons were involuntary accomplices. Sir Astley Cooper—who, from his intense passion for post-mortem inspection, joined to his physical beauty, might be compared, not to Æsculapius, but rather

to Apollo his father, flaying Marsyas—used to relate with complacency the adventures of his hateful purveyors, and the regular traffic in which he employed them. As he paid liberally, he was always well supplied, which justified him in saying, when examined by the Committee of Inquiry in the House of Commons, "There is not an individual dies in London, let his rank be what it may, whose body I cannot have in my amphitheatre if I choose!" Thus he felt himself called upon, as a matter of conscience, to bequeath his own by will to the knife of the anatomist.*

Sir Astley's amphitheatre supplied the novel writers with a source of mysterious horrors infinitely richer than that of Charles Bell. But what the latter might chiefly envy his brother labourer

* *Note by the Translator.*—Science is both enthusiastic and callous. The writer of this note, when residing in Edinburgh, in 1823, was invited by a friend to accompany him to the Infirmary, to leave a poor man there in whom he took much interest, named Berry, formerly an actor of repute on the Scotch stage, who, by a long course of intemperance, had brought himself to death's door. On coming out, we were accosted on the steps by an extremely well-dressed, bland-looking young gentleman, who observed, "You have, I see, left poor Berry within. He is booked, and will not live a week. I'll give you three guineas for him—more than so miserable a subject is worth, and considerably less than a funeral will cost." We declined the offer, and buried the unlucky patient within ten days. In all probability, he was *lifted*, as they used to call it, the same night.

was the ever-increasing number of his pupils, which enabled him to declare, during the last years of his life, "I have educated more than eight hundred English surgeons."

Compelled to be more modest when he reckoned up his own contributions, Charles Bell at least entertained the hope that, sooner or later, he should distinguish himself by some surgical operation or physiological discovery, of which he might be as justly proud as was Sir Astley of his ligature of the aorta. On the 5th of December, 1807, we find him, in a letter to his brother, approaching his object.

"My new anatomy of the brain is a thing that occupies *my* brain almost exclusively. I hinted to you formerly that I was *burning*, or on the eve of a grand discovery. I consider the organs of the outward senses as a distinct class of nerves from the others. I trace them to corresponding parts of the brain, totally distinct from the origin of the others I take five tubercles within the brain, as the internal senses; I trace the nerves of the nose, eye, ear, and tongue to these, and there I see established connexions; then, the great mass of the brain receives 'processes' from the central tubercles. Again, the great mass of the cerebrum

sends down processes, or crura, which give off all the common nerves of voluntary motion; and I establish, as it were, a kind of circulation. In this inquiry I describe many new connexions; the whole opens up in a new and simple light; the nerves take a simple arrangement, and the parts have appropriate names—the whole according with the phenomena, with pathology, and supported by interesting views. My object is not to publish this, but to lecture it to my friends—to lecture it to Sir Joseph's coterie of old women—to make the town ring with it: as it really is *the only thing that has appeared in anatomy since the days of Hunter.*"

The careless style of this quotation bears marks of the confusion which perhaps reigned in Charles Bell's ideas. Still influenced by the hesitating doubts of a first discovery, he sought the aid of sympathetic approval before he asked for the public verdict. This sort of encouragement was absolutely necessary to him ever since he had passed from the tender lessons of his mother to the severe, unsparing discipline of John Bell. He found it difficult to pardon that master for the harshness of his instruction. Ten years later, being consulted by his brother George, on the turn for drawing

exhibited by one of his young nephews, he replied, "I know no better method than to put a pencil in his hand to encourage him, and not to treat him as a certain brother of ours did me at the same age. I had drawn, with great care, a Venus, in the most graceful attitude that could be imagined, when returning to my work, I found that, with a stroke of the pencil, he had given her the unbecoming support of a pole fixed in the ground, on the side towards which she unfortunately leaned too much. Such an ill-timed joke tends to check the ardour and talent of a child. Encourage yours!"

Acting under this sentiment, Charles Bell rallied all his friends in support of his idea. He expressed it to his brother George, with a mixture of uncertainty and confidence in himself which marks his character. "Take a book of anatomy," he writes to him in 1808, "be it the *Encyclopædia*, that you may know my merits. I confess I like it the more I consider it; but this is the way with all hobbies, you will say." A week later, he is entreating his brother to correct and transcribe a manuscript, and then submit it to Jeffrey and Playfair, in Edinburgh—"as I will," he says, "to Brougham in London." Again, when the manuscript comes back with their approbation, however contemptuously

he estimates the London anatomists, it is their coldness that vexes him.* He relinquished for a time the thread of his discoveries, and occupied himself with other matters. He drew, wrote his letters on hernia, his papers to the Royal Society, prepared and delivered two lectures, and multiplied his labours to deceive himself. At length, after the lapse of a year, he exclaims, "Oh, for time to finish my 'Brain!' It shall be good."

In 1809, practical surgery diverted him for a while from his despondency. After the retreat to Corunna, the English army sent home their wounded men. The London surgeons were called into requisition. Charles Bell gladly availed himself of this opportunity to improve his skill as an operator. We now find that this military practice excited his ardent sensibility.

"*Haslar Hospital.*—'Who goes there?' 'A friend.' 'Countersign?' 'Spain.' 'Pass, friend,' and 'All is well.' Such is the frequent call under my window. I wish I had written to you describing my first sensations, which were, I trust, what

* "They cannot judge of it," he wrote, either in vexation or anger. "One does not understand its importance; another would be more charmed by a beautiful essay than by the discovery of the most striking fact."

every good man should feel. They are blunted by repetition, and I hate myself for being what I am, so mere a creature like the rest, going about my common affairs. I have muttered bitter curses and lamentations, been delighted with the heroism and prowess of my countrymen, and shed tears of pity in the short space of a few minutes. I find myself, my dear George, in a situation unexpected and strange, such as I hope you may never see. I have stepped over hundreds of wretches in the most striking variety of woe and misery, picking out the wounded. Each day, as I awake, I still see the long line of the sick and lame slowly moving from the beach. It seems to have no end. And there is something in the very slow and interrupted motion of these distant objects singularly affecting."

Charles Bell was fond of analysing his feelings in all the vicissitudes of his temperament, alternately enthusiastic and melancholy. A dangerous illness which attacked him after his service in military surgery was marked by a long delirium, the principal scene of which he took pleasure in describing, as it reproduced dramatically the familiar images of his constant pre-occupation. If artists and poets do not possess the exclusive privilege of

these sick dreams, they alone have the power of knowing how to relate them.

"My dear George, my dearest brother, after seven days of delirium and great suffering, this is the first comfortable time in which I can round my pillow into the writing posture. You think too deeply of this illness of mine. As to the delirium, for the first nights it was agreeable. A painter, with a look of self-gratulation, placed his picture on an easel before me; another, with an air of conscious superiority, displaced the first and substituted his own instead; a third frowned and terrified the last; until, in rapid succession, I saw the finest pieces of history, the most romantic scenery, banditti, ruins, aqueducts: still I had self-command enough to know this was all an exuberant fancy which I indulged. By and by, this same process of mind became less and less light in what it exhibited. I seemed to lie amongst legs and arms; my dressing-gown became a frowning object; a fold of the bed-clothes, a limb, to which I added what was necessary to make up the figure. Every absurdity of my imagination I observed to have a distinct origin in the impression on the senses. When the light was vivid, the candles and fire bright, the truth of sensation corrected all

absurdities. In total darkness I was free of all false perceptions; but in the obscurity of the rushlight, or that grey canvas which seemed to be drawn across my vision by the shutting of the eyelids, the reflex sensation perpetually exhibited the most romantic scenes, the richest ornaments, or the gayest festoons of flowers. Such is the history of my delirium, which has given you, my dear brother, so great uneasiness. Illness, I think, makes me selfish; I have little warmth of feeling for any but yourself at this moment; but as I never concealed a thought from you, I say that I have a selfish fit. Biography is, beyond all other kinds of reading, delightful; and the fruit of it is, the pleasure one has in perusing that long, garrulous narrative of Gibbon's life. May I not say I have been swayed and mastered by the same kind of ambitious desire of excelling? Even in my present sickness I have been incessantly intent on the idea of some great work. Sometimes I think of finishing my *Anatomy of the Muscles,* or of painting in grand style. I have had thoughts of entering on a great work on pathology. *The Brain* I still wish to resume, after giving out a short account of my view, as taken from my lectures. It was this which I proposed to you to print in Edinburgh. In short,

this inertia of the body has stirred up my ambitious projects."

Strange destiny of genius: illness alone restores to Charles Bell the consciousness of his labour and his inspiration. In 1811, after his recovery, he printed his *Idea of a New Anatomy of the Brain;* but even then only venturing to risk a demi-publicity, he confined its distribution to his friends and the profession; an unpropitious experiment, which excited no criticism, and threatened to stifle his enthusiasm for ever. In other respects he submitted with apparent patience to this inexplicable indifference. Believing himself cured of an illusion, fatal alike to his happiness and fortune, he resolved in future to turn his thoughts exclusively to both. To supply food for his need of sympathy, he married.

In a Scotch family he found the companion of his matured years, the wife of his heart; and from the following letter of Jeffrey, we find that she charmed him the more, as in her he admired also the tender personification of his absent country.

"Edinburgh, 4th of April 1811.

"MY DEAR BELL,

"Not many things in this world could give me greater pleasure than the affectionate tone of

your letter, and the pleasing picture it holds out to me. You are doing exactly what you should do; and if my approbation is at all necessary to your happiness, you may be in ecstasy. I think all men who are capable of rational happiness ought to marry. I think you in particular likely to derive happiness from marrying; and I think the woman whom you have chosen particularly calculated to make you happy. God bless you! You have behaved hitherto with admirable steadiness and magnanimity, and have earned the confidence of all your friends, as well as the means of enjoyment. I cannot lament your nationality very bitterly, both because it holds of all that is happy and amiable, and because I hope it will give us a chance of seeing you often amongst us. Besides, when you have Scottish tones and smiles perpetually before you, London will become a sort of Scotland to you. You have but two faults in your character, and I think marriage will go a great way to cure them both. One is a little too much ambition, which really is not conducive to happiness; and the other, which arises, I believe, from the former, is a small degree of misanthropy, particularly towards persons of your own profession. Your wife's sweetness of temper will gradually

bring you into better humour with the whole world, and your experience of the incomparable superiority of quiet and domestic enjoyments to all the paltry troubles that are called splendour and distinction, will set to rights any other little errors that may now exist in your opinions. At all events, you will be delivered from the persecution of my admonitions, as it would be a piece of unpardonable presumption to lecture a man who has a wife to lecture him at home.—F. J."*

The ambition with which Jeffrey reproached his friend was not very unreasonable. His misanthropy towards his professional brethren also, amounted to little more than suspicion too well founded. Charles Bell was never aggressive, but sometimes compelled to stand on his defence. Finally, as a married man, who might soon, too, become a father (a blessing, mixed with anxieties, not destined to be his), he felt himself called upon to secure the necessary means of life before he followed up his dreams of glory. He therefore invested the small dowry his wife brought him in purchasing a share in a private establishment of medical instruction, known in London as the *Hunterian School of*

* *Life of Francis Jeffrey, with a Selection from his Correspondence.* By Lord Cockburn. 2 vols. Edinburgh. 1852.

Medicine in Windmill Street, of which he naturally became the principal professor.

He found in this position an increasing income and a means of rendering his name more popular by lecturing to a greater number of pupils. For some time his ambition seemed to be concentrated there. His brother George reminded him in vain of his scientific dream. He spoke of it in reply as really a *dream*, with the tone of a man converted to practical philosophy, satisfied with the substantial credit of a regular professor, and aiming only at the repute of a popular connexion.

Writing to his brother in 1814, he says:—"Here I am again with my class at ninety, as in Edinburgh; but I shall not rest until I have a hundred and fifty. But of this be assured—Windmill Street is what it ought to be. I gave my lecture yesterday so as to please myself. You were always a great advocate for pleasing oneself, as affording the best instance of satisfying others. However, I am not so buoyed up with the promise of success as I was in former days. The mind is changed; *I am more prepared for disappointments, and better able to bear them.*"

The suspected genius was then forgotten, as Charles Bell seemed to forget it himself; and as

soon as he appeared to be no more than the prosaic practitioner, without any alloy of the poetical innovator, he was allowed to attain a post hitherto coveted in vain. The governors of the Middlesex Hospital elected him surgeon to that establishment; a high position, equivalent to a chair of clinical surgery; for in London, the *College of Physicians* is not a *Faculty* of Medicine, and the true official *school*, before there was a London University, has always been comprised in the lectures of the hospital physicians and surgeons. Charles Bell thus became at last the acknowledged colleague of the Astley Coopers, Abernethys, and other medical and surgical celebrities of the highest rank in London, who have advanced science by their extensive practice, traditional teaching, and manual dexterity. In these three relations Charles Bell stood as the rival of his most eminent contemporaries. He handled his operative instruments with surprising delicacy, while his discourse was eloquent though unequal; for if he usually confined himself to a simple and familiar commentary, sometimes also following the precepts of his brother George, he yielded to the desire of self-satisfaction, and became the artist, the poet, and child of imagination, who charmed his auditory

by profound and original remarks. At times he still cherished and reverted to his grand idea, taking care not to intrude it on the indifferent listeners by whom it had been so ill received.*

He thought more of it for his own gratification than for the benefit of others, and at last brought himself to a conviction that the pursuit of his discovery was the egotistical gratification of a scientific vanity. In this point of view he looked upon it as an act of barbarism to sacrifice living animals to his fruitless experiments.

"I should be writing," he said to his brother, "but I cannot proceed without making some experiments which are so unpleasant to make that I defer them. You will think me silly, but I cannot perfectly convince myself that I am authorized in nature or in religion to do these cruelties —for what? For a little egotism or self-aggrandizement; and yet what are my experiments in comparison with those which are daily done for nothing?"

This sensibility made Sir Astley Cooper smile, for to his human autopsies he added hecatombs of animals. Fortunately, too, it did not prevent Charles

* "I am occasionally engaged in dissections of the brain and nerves"

Bell from becoming a brilliant operator. His *System of Operative Surgery* (a work published in 1807, which has gone through three editions), contained no description of an operation he had not himself performed, "from bleeding in the arm to lithotomy with the knife alone—from tying the umbilical cord to the Cæsarian section." We can understand how much a man must have suffered in being thrown back from theory to practice, who never took the scalpel in his hand without enduring the agony he was about to inflict on his patient. Notwithstanding this, his experimental enthusiasm carried him away again when the campaign of 1815 offered an opportunity of studying gun-shot wounds on a field of battle. He left London of his own accord to practise military surgery at Waterloo.*

The grandeur of the events recently acted on that theatre still reeking with blood, suddenly excited

* "What I feel dwelling on my mind are my claims on military surgery. I shall make them out in some way, but how I know not. I feel that I am entitled to the merit of settling the grand questions of practice, particularly in regard to the deep incisions on bones, and the operations for the extraction of the head of the humerus. But I am very doubtful of myself, and I find a hostile feeling to me very general in the profession." In the account he gives of one of his operations, Charles Bell dwells particularly on the conduct of a surgeon named Latta, who, to disturb him, imitated with his voice the croak of a raven.

the imagination of Charles Bell, and it is more in the vein of a poet than an operator that in his journal he relates his visit to the fatal plain where the closing act of the imperial drama was unravelled. He ascended the elevated platform whence Napoleon himself contemplated his last field of battle. He compares the Emperor to Macbeth beholding Macduff and the English army advancing upon him, and while he indulges in an allusion to his tyranny, does not pretend to conceal his admiration for his genius.

Here the journal and correspondence of Charles Bell with his brother belong to history. The national flag of France has since so amply repaired the defeat it suffered on those fatal plains, that we need not fear to indulge in ample quotations. From the farm of Hougoumont, Charles Bell rode over rising ground still covered with standing corn, and looking below, traced the movement of the French columns, which had made wide streets through the fields, completely beating down the crops that intercepted their passage.

"About half a mile of ascent brought us to the position of Buonaparte. This is the highest ground in the Netherlands. A noble expanse is before the eye; and the circumstance of the

ground being still imprinted with the tyrant's foot—the place where the aides-de-camp galloped to and fro—the whole of this important field under the eye—fires the imagination.

"I climbed up one of the pillars of the telegraph, as I was wont to do after birds' nests, but I found myself more heavy. We got a ladder from the farm court; it reached near the first platform—I mounted, and climbed with some difficulty; none of the party would venture, so I feel rather youthful. The view magnificent! I was only one-third up the machine, yet it was a giddy height. Here Buonaparte stood surveying the field. What name for him but Macbeth?—A man who stands alone. There is something magnificent in this idea. There, exalted to a giddy height, and how much farther to descend than to the ground! His friends dispersed, his squadrons broken; and well he knew—for he seems to know mankind—well he knew the consequence.

MACBETH. What soldiers?
SERVANT.—The English force, so please you.
MACBETH. This push
Will cheer me ever, or disseat me now.
I have lived long enough——
Honour, love, obedience, troops of friends,
I must not look to have; but in their stead
Curses, not loud but deep, mouth-honour, breath,
Which the poor heart would fain deny, but dares not.

"He must have turned to the right of the scaffolding, and joining the road (the Chaussée), a little to the south of La Belle Alliance, there he must have met the wreck of his forces. A little farther on this road his carriage was found. The position of Buonaparte was most excellent. The machine was placed by the side of the road, but he ordered it to be shifted. The shifting of this scaffolding shows sufficiently the power of confidence and the resolution of the man. It is above sixty feet in height; I climbed upon it four times the length of my body, by exact measurement; this was only the first stage. Standing here, it was a giddy height. I was filled with admiration of a man of his habit of life who could stand perched on a height of sixty-five feet above everything, and contemplate, see, and arrange such a scene. Already stillness dwells here; mid-day, and the sun bright, and all shining in gladness, yet a mournful silence. No living thing is here; no kites, no birds of any kind, nothing but a few wretched women and old men scattered on the height at a distance, who are employed in gathering balls."

The preceding is an extract from the journal dated in June.

On the 2nd of July, Charles Bell was at Brussels, whence he wrote a letter to his brother George, which the latter communicated to Walter Scott. "When I read it," says the poet-novelist, "it set me on fire;" and he resolved also to perform a pilgrimage to this "grave of France," where, as Lord Byron sings (who followed his example at a later period)—

"Last the eagle flew,
And tore with bloody talon the rent plain."*

"Brussels, 2nd July, 1815.

"This country, the finest in the world, has been of late quite out of our minds. I did not, in any degree, anticipate the pleasure I should enjoy, the admiration forced from me on coming into one of these antique towns, or in journeying through this rich garden. Can you recollect the time when there were gentlemen meeting at the Cross of Edinburgh, or those whom we thought such? They are all collected here. You see the very men, with their scraggy necks sticking out of the

* In the first edition of the third canto of *Childe Harold*, Byron had made the eagle tear the ground with his beak; but the artist Reinagle having sketched for him an eagle embracing the globe with his claws, Byron substituted *talon* for beak, saying, "Reinagle is a better poet as well as a better ornithologist than I am. The eagle, like all birds of prey, attacks with the claws, and not with the beak."

collars of their old-fashioned square-skirted coats, their canes, their cocked hats; and when they meet, the formal bow—the hat off to the ground, and the powder flying in the wind! I could divert you with the odd resemblances of the Scottish faces amongst the peasants too, but I noted *them* at the time with my pencil, and I write to you only of things that you won't find in my pocket-book.

"I have just returned from seeing the French wounded received in their hospital, and could you see them laid out naked, or nearly so, a hundred in a row of low beds on the ground—though wounded, exhausted, beaten—you would still conclude with me that these were men capable of marching unopposed from the west of Europe to the east of Asia. Strong, thickset, hardy veterans, brave spirits, and unsubdued as they cast their wild glances upon you — their black eyes and brown cheeks finely contrasted with the fresh sheets—you would much admire their capacity of adaptation. These fellows are brought from the field after lying many days on the ground; many dying — many in the agony — many miserably racked with pain and spasms; and the next mimics his fellow, and gives it a tune,—*Aha, vous chantez bien!* How they are wounded you will

see in my notes; but I must not have you to lose the present impression on me of the formidable nature of these fellows as exemplars of the breed in France. It is a forced praise; for from all I have seen, and all I have heard of their fierceness, cruelty, and blood-thirstiness, I cannot convey to you my detestation of this race of trained banditti. By what means they are to be kept in subjection until other habits come upon them, I know not; but I am convinced that these men cannot be left to the bent of their propensities.

"This superb city is now ornamented with the finest groups of armed men that the most romantic fancy could dream of. I was struck with the words of a friend, E——: 'I saw,' said he, '*that* man returning from the field on the 16th. [This was a Brunswicker of the Black, or Death Hussars.] He was wounded, and had had his arm amputated upon the field. He was amongst the first that came in. He rode straight and stark upon his horse; the bloody clouts about his stump,—pale as death, but upright, with a stern, fixed expression of feature, as if loth to lose his revenge.' These troops are very remarkable in their fine military appearance; their dark and ominous dress sets off to advantage their strong, manly

northern features and white moustaches, and there is something more than commonly impressive about the whole effect.

"This is the second Sunday after the battle, and many are not yet dressed. There are 20,000 wounded in this town, besides those in the hospitals, and the many in the other towns; only 3000 prisoners; 80,000, they say, killed and wounded on both sides."*

This letter had the same effect on the warlike imagination of Walter Scott which the trumpet produced on the courser of Job. He hurried over to describe in turn, both in prose and verse, some of the episodes of that *Iliad*, whose Achilles he, a Tory Homer, had a just right to seek under the victorious standard of England.†

Charles Bell, although excited for the moment by a victory to which his brave countrymen, the Highlanders, contributed an important share, soon began to contemplate the events passing around him with a more subdued feeling, and already em-

* Mr. Lockhart, son-in-law of Sir Walter Scott, has inserted this letter in his father-in-law's biography.

† Sir Walter Scott's poem on Waterloo is not a happy specimen of his genius; but he was calumniated by the report that his venal muse undertook it for *profit* rather than *fame*. It was published expressly for the benefit of the wounded.

barked at Ostend, but detained in the roads, he expressed as follows, in his journal, the mournful reflections occasioned by a private calamity, the news of which he had received a few days before. This was the suicide of Mr. Whitbread, son of the wealthy brewer ; rich himself, and in great credit, a Member of Parliament, and connected by marriage with the high aristocratic circle, who suddenly, in a fit of madness, put an end to his own existence.

"*Ostend, Sunday.*—Still here. It is vain to say how much I might have done in Brussels—how much enjoyed at home. Here we lie, like a log on the water. We hear much of the Allies in Paris —of the armistice, and of Whitbread! Alas! how sincerely I lament him! He did much for me in a matter I had greatly at heart. He appeared to have a sincere, kindly manner, quite at variance with his public character. He who seemed a man made to buffet with the world—to cut his throat! I am yet inclined again to say, 'It is a lie!' It is this, more than the unpleasant suspense in which I am kept, that frets me with the time. How precious is a just way of thinking, a love for mankind, a desire of doing good! which, I should think, was likely to prevent a man letting

this gloom quite overshadow him, and obscure his reason; besides, is there not a terrible want of regard for the feelings of others in this act? I'll to the deck again, and contemplate this weary scene as the sun goes down. How precious are dear friends, and how much dearer they become in this desolation amidst a throng! The night is cold, grey, northern, and unkind; the wind rather in the shrouds; the tide is down, and the harbour without its activity."

None of us can escape from these painful reflections on human nature when we find that one of ourselves, a friend, or possibly a benefactor, who, the evening before, we might have congratulated as being happier than we, has suddenly deserted his post, subdued by a secret grief or deprived of reason. Poor reason! of which we are so proud, which we call an emanation of the Divine essence, although we sometimes employ it (another extravagance of pride),to argue against God himself, the Author of all intelligence and light! Poor reason! It is in cases like these, when she wanders or disappears, that the physiologist or philosopher recapitulates all the various experiments by which he has endeavoured, like some of his predecessors, to enthrone her in an independent organ; at one

moment in the circumvolutions of the brain, at another in the cerebellum ; again, in the pons Varolii, in the pineal gland, and in some other portions of the encephalic and medullary substance.* "Alas! poor Yorick!" Your empty skull taught as much to Hamlet. Must the *scire nihil* then be the commencement and end of all philosophy?† Philosophers, moralists, and physiologists admit, and are often reduced to avow, that Bacon said truly, "The sole cause and root of nearly all the imperfections in science is this, that while we erroneously admire and exalt the power of human reason, we forget to appeal to its true supports."‡ It is good, sometimes, if the sea is within reach, to traverse the beach, or mount with Charles Bell the deck of a ship, to salute the sun, that image of the Divine eye, lighting up in its noiseless and resplendent passage the calm waters or the turbulent waves shaken to their deepest abyss.

Charles Bell, on his return to his domestic hearth, sought once more to recapitulate his impressions and feelings during his surgical campaign, and wrote thus to Francis Horner:—

* When the philosopher Hamilton resolved to refute the system of Gall, he dissected, it is said, several hundred brains.

† *Scire nihil—studium quo nos lætamur utrique.*

‡ *Novum Organum*, Lib. i. aph. 4.

"London, July, 1815.

"MY DEAR HORNER,

"I write this to you, after being some days at home engaged in my usual occupations, and consequently disenchanted of the horrors of the battle of Waterloo. I feel relief in this, for certainly if I had written to you from Brussels, I should have appeared very extravagant. An absolute revolution took place in my economy, body and soul; so that I, who was known to require eight hours' sleep, found three hours, and then one hour and a half, sufficient, after days of the most painful excitement and bodily exertion.

"After I had been five days engaged with the prosecution of my object, I found that the best cases, that is, the most horrid wounds left totally without assistance, were to be found in the hospital of the French wounded. This hospital was only forming; they were even then bringing these poor creatures in from the woods. It is impossible to convey to you the picture of human misery continually before my eyes. What was heart-rending in the day, was intolerable at night; and I rose and wrote, at four o'clock in the morning, to the chief-surgeon, Gunning, offering to perform the necessary operations upon the French. At six o'clock I took

the knife in my hand, and continued incessantly at work till seven in the evening; and so the second day, and again on the third.

"All the decencies of performing surgical operations were soon neglected; while I amputated one man's thigh, there lay at one time thirteen, all beseeching to be taken next: one full of entreaty, one calling upon me to remember my promise to take him, another execrating. It was a strange thing to feel my clothes stiff with blood, and my arms powerless with the exertion of using the knife; and more extraordinary still, to find my mind calm amidst such a variety of suffering. But to give one of these objects access to your feelings was to allow yourself to be unmanned for the performance of a duty. It was less painful to look upon the whole, than to contemplate one.

"When I first went round the wards of the wounded prisoners, my sensations were very extraordinary. We had everywhere heard of the manner in which these men had fought—nothing could surpass their devotedness. In a ward containing fifty, there was no expression of suffering; no one spoke to his neighbour; there was a resentful, sullen rigidness of face, a fierceness in their dark eyes, as they lay half covered in the sheets.

"*Sunday.*—I was interrupted, and now I feel I was falling into the mistake of attempting to convey to you the feelings which took possession of me amidst the miseries of Brussels. After being eight days amongst the wounded, I visited the field of battle. The view of the field, the gallant stories, the charges, the individual instances of enterprise and valour, recalled me to the sense which the world has of victory and Waterloo. But this was transient. A gloomy, uncomfortable view of human nature is the inevitable consequence of looking upon the whole as I did—as I am forced to do.

"It is a misfortune to have our sentiments at variance with the universal sentiment. But there must ever be associated with the honours of Waterloo, in my eyes, the shocking signs of woe: to my ear, accents of intensity, outcry from the manly breast, interrupted, forcible expressions from the dying—and *noisome smells.* I must show you my note book, for as I took my notes of cases generally by sketching the object of our remarks, it may convey an excuse for this excess of *sentiment.*

"Faithfully yours."

In this account we recognise in Charles Bell one of those true sons of Æsculapius, "with the heart

of a woman and a hand divine," such as Homer, interpreted by Lamartine, describes Machaon in the *Iliad.**

At this epoch, rich patients came in to complete Charles Bell's practice. He was consulted by several of the distinguished foreigners who visited England at the peace of 1815; but his surgical campaign seems to have had the effect of alluring him back to physiologic science, and the more readily, as the entire revenue derived from his profession fell below his expenses in a city like London. Finding himself on a par with the greatest operators, without, like them, realizing a fortune, he resolved to wake up the learned world by a last effort. Having condensed his early experience into an essay, he read his paper to the Royal Society.

With that erudite body, as with the English public in general, chemistry was then more in favour than physiology. Chemistry was the fashionable science. Ladies contended for places at the lectures of Sir Humphry Davy, the great magician, the poet-chemist, who deserved even more than the fame so profusely showered upon him.

* See in Lamartine's *Cours Familier de Littérature*, an analysis of the *Iliad*.

Charles Bell was so fully prepared for a check, or rather to receive one with stoical indifference, that he produced his paper with little anticipation of success. But, on finding that he had at last created a sensation, in spite of his constitutional modesty, he gave way to an ebullition of pride. When his essay on the Nervous System appeared in the *Philosophical Transactions* for 1821, it set the medical world in a stir, and caused him to write as follows to his brother:—

"I send you some letters which I have received on this occasion. They will serve to convince you that I am not a visionary on this subject; but I know better than others can tell me what is to become of the matter. It gives me a power of doing what I choose now, and will hereafter put me by the side of Harvey—but this is in your ear. Harvey was said to have had the way prepared for him, so that he could not miss it: so fools argue the matter. But the discoverer of the Nervous System had nobody to go before him, for the researches of anatomists had only rendered the subject more intricate and obscure! Still I find my character higher than my fortune—compliments, not money. On Saturday I had a surgeon from Manchester to consult me on his own case; on Monday a phy-

sician from Hull; and to-day a patient sent from Paris—from Turin—from Pavia; with the universal opinion that I was the man to cure him. Indeed, he brought this opinion from the excellent Scarpa."

A month later, this tone of triumph still continues, and may well be pardoned in a man who had waited so long for a little encouragement. In December, 1821, he says:—

"Joking apart, I stand alone in anatomy! This business of the nerves may be long of coming forward exactly as it should; but my ambition has a rest in this—*I have made a greater discovery than ever was made by any one man in anatomy*, and I have not yet done."

CHAPTER III.

Sketch of Charles Bell's system—Opinions of the ancients—Hippocrates—Aristotle—Herophilus—Galen—Celsus—Vesalius—Willis—Haller—Bichat—Gall and Spurzheim—Scarpa—Monro—Hunter—Vicq d'Azyr—Sœmmering—Newton—Cuvier—Barthez—Van Helmont—Marshall-Hall—Demonstration—Thomas Young—Abernethy—M. Flourens—M. Magendie—Cosmopolite science—Parallel—Recurrent sensibility—M. Dubois d'Amiens—Messrs. Longet, Brown-Séquard, &c.—Messrs. John and Alexander Shaw—The ass, the ape, and the mimic—Goethe, botanist and physiologist—Professors Owen, Davy, Faraday, Whewell—*Lex Belliana*—Professor Lawrence—Essay on the forces of the circulation of the blood—Experiments in physiology—Vivisection—A sixth sense—The Bridgewater Treatise on the Hand—The Christian advocate—Quintilian on the Hand—The nervous circle—The cerebellum—Milton and the sense of sight—Final causes—Dr. Chalmers—The telescope and the microscope.

WE must now sketch the system of Charles Bell.

Alternately armed with the scalpel of anatomy and the re-actives of chemistry, physiology has decomposed all our organs. It has minutely described, laid bare, measured and weighed all that is visible either to the eye or the magnifying glass, all that is tangible, or ponderable in the human body; that wonderful machine which the admiration of the ancients denominated a world *in*

miniature—a microcosm. Under the title of *comparative* physiology, it has embraced within the circle of its study, not only man, but every other organized being. The mechanism and action of solids and liquids have been entirely defined; but physiology, a science of analysis, has, when applied to synthesis, been sometimes reduced to guess at certain phenomena; and then, when experiments directed by genius have occasionally discovered secrets hitherto only explained by conjecture, it has often been found that the most ingenious hypothesis was the farthest from the truth, because human invention inclines voluntarily to the subtle, while nature always adopts the simple.

The most important endowments of life are included in the nervous system, which embraces the brain, the organs of the senses, and the organs of volition. "The nervous system," according to Charles Bell, "is therefore that part of anatomy in which are to be discovered not only the different properties of the living fibre, but also the relations of the organs with each other." For this reason, the nervous system, during three thousand years, has supplied a text for extravagant theories, and something still remains to furnish a topic for those who are so much disposed to attribute a leading part to their nerves in health and in

sickness. Hippocrates confounded together the nerves, cartilages, and ligaments under the one specific term of neura (νευρὰ). Aristotle placed the origin of the nerves in the heart. Herophilus, under the first of the Ptolemies, discovered the connexion between the nerves and the brain. Galen, a sagacious observer, and already a learned anatomist, was able to distinguish the nerves from the muscular fibres and ligaments; but yielding to the popular metaphysical notions, he assigned love to the liver, and placed in the heart the source of emotions, courage, and anger. Celsus, in his Latin classic, pointed out the distinctions between the nervous functions, but rather as a presentiment than a conviction. In the sixteenth century, Vesalius delivered an opinion which long prevailed; namely, that the vital powers were engendered in the brain, and distributed themselves to all the nerves through the intermediary of the spinal marrow. In the last century, Willis classed the nerves systematically, and put forth several ingenious conjectures on the endowments and circumvolutions of the brain; but, according to him, that organ was still the centre of the cerebral faculties of Galen, the source of a subtle current distilled through the nerves. Haller—the great Haller—carefully studied all the opinions of his predecessors,

and retained his own, which however remained in the state of a confused hypothesis. Sœmmering modified the classification of Willis, and made excellent remarks, but he said nothing conclusive on the action of the ganglions, which Bichat seized upon to divide the nerves into two distinct systems; the one, having its centre in the brain, and including the nerves intended to receive impressions, as well as those charged with transmitting the influence of will to the muscular development; the other emanating from the ganglions, each ganglion being a small brain, the source of a particular nervous action. This idea led to that of the famous division of life into animal and organic existence—"a bold and original notion," says Charles Bell, "which proclaims Bichat a great genius, but anatomically incorrect."* Gall and Spurzheim vainly explored the brain and its appendants in search of their significant protuberances. Cuvier, in fine, as late as 1817, ascribed the ebb and flow of perception and motion to the flux and reflux of a nervous fluid. In the first edition of his *Animal Kingdom* he

* Charles Bell did not forget to call attention to the fact that Bichat, a true revolutionist in physiology, as his contemporaries of the Convention were in politics, had declared that one nerve could not serve for sensation and another for motion. He quoted, in

says: "It seems to us that we may account for all the phenomena of physical life by the single admission of such a fluid as we have just described —the nervous fluid."* I am therefore justified in saying that in the reign of the Emperor Napoleon the First, we were still endeavouring to solve the problem laid down by Galen, under Marcus Aurelius. If there was any truth in these opposite doctrines, some ingenious, others simple, there was also abundance of error in all. Conjectural physiology never ceased to argue on the nerves, or their nature and functions. But neither Harvey, nor Haller, nor Scarpa, nor Willis, nor Monro, nor Hunter, nor Vicq d'Azyr, nor Sœmmering, nor Bichat, nor Cuvier, had been able to settle this question: "How does it happen that in the muscular portions of the body, it is at one time motion that is abolished, at another sensibility, and occasionally both together?"

One of the most delicate preparations of anatomy is that which, stripping the body of its

proof, this sentence from the *Anatomie Générale*, vol. i. p. 128:— "There is not one set of nervous cords intended for sensation, and another for motion; and if the same nerves do not serve both purposes, the difference lies in the filaments and not in the cords."

* The nervous fluid is, like the essence of the brain, an undefinable substance, materially resembling the purest part of the white of an egg; or, according to Newton, an emanation of celestial ether.

integuments, exposes and brings under the eye the minutest ramifications of the nervous system. We can trace from their roots to the organ where they end, those delicate cords of which a membraneous sheath (*Neurilema*) protecting in the passage their softness and tenuity, encloses sometimes a single filament, and at others two. The substance of this network (*plexus*) being the same, it was thence concluded that all the nerves had the same properties, and contributed equally to the double object of transmitting *sensation* to the brain, and reciprocally *will* and *motion* to the muscles.* Motion and sensibility being the two great functions of life, functions also perfectly distinct (one being able to operate without the other), Charles Bell asked himself how nature could have made them emanate from one common conductor. "Let us examine," he says, "in what direction the nervous influence which gives birth to motion, must necessarily be transmitted through the entire length of a nerve so as to produce muscular contraction. Since will has its origin in the brain, and the force, whatever it may be, which acts upon the nerve, must be diffused towards the muscle, it is evident that this

* Cullen picturesquely called the muscles the *moving extremities* of the nerves.

force will proceed from within to without, or as a *centrifugal* force. But when a sensation takes place, since the effect must be produced by the impression made on the extremity of the nerve expanded under the epidermis, and transmitted by the nerve itself to the sensorium, it is also evident that this second force is a nervous current which proceeds from the circumference to the centre, or a *centripetal* force. In a word, the force which precedes muscular contraction runs along a nerve in one direction, and the force which causes sensation runs in another. Is it then logical to suppose that the two forces cross each other thus ;—that the same nerves, or the same portion of the nervous centres, exercise two functions at a time ?"*

Some organs appeared to have but one nerve ; if this single nerve were cut, the two functions would be suppressed. "But," still, said Charles Bell, "are these *single* nerves really single ?" By a more careful dissection he ascertained that these nerves, in appearance single (the spinal nerves), sprang from two roots, and were composed of two distinct filaments. By isolating one of these filaments from its anterior root to the organ, and by

* It is thus that Charles Bell proposed the problem to himself as laid down from his notes, in a dissertation which serves as an appendix to the *Anatomy and Philosophy of Expression*, 4th ed., 1847.

irritating that root, he saw that the muscle became convulsively contracted; he then touched the posterior root, and the animal under experiment evinced symptoms of acute suffering. This animal was a living ass, whose spine had been laid bare. To complete the experiment, it was necessary to repeat it, to produce again the muscular movement by irritating the anterior root of the spinal nerves, and to cause a painful sensation by irritating the posterior root. But the compassion Charles Bell felt for his victim arrested him. He contented himself for a long time with expressing, under a certain degree of hesitation, the opinion, so well confirmed since, that there are nerves exclusively *sensorial*, others exclusively *motive*, and others again *mixed* (all belonging to the spinal marrow); that is to say, composed of two distinct filaments, the one entirely sensorial; the other entirely motive. It was wrong to say that Charles Bell stopped there. "Already, however," as one of his pupils justly remarks,* "in all sound logic the proof was complete: the section of a spinal nerve had been long known to cause the loss of both sensation and motion; and as motion was proved by Bell to belong to the anterior root, it followed that the posterior must be the nerve of sensation.

* *Quarterly Review*, No. cxliii.

Bell remarked that this last nerve throughout the spine had a ganglion or bulge on its root, and that the nerve of motion had not. Looking once more to his anatomy, he found a nerve of the head which arose from two roots, and on one of these there was a ganglion, and none on the other. In spite, therefore, of the classification of previous anatomists of this nerve as belonging to the brain, he conjectured that it was a spinal nerve fitted to give sensation and motion to the various parts of the head. In this nerve, the fifth, the two roots, instead of being bound up into one case or sheath, as are the spinal nerves, run separate, and come to the very surface of the face. Bell at once saw that everything was under his hand. By and by, a puncture, causing less suffering than that occasioned by the operation for bleeding, enabled him to reach these separated roots; and accordingly, he had the satisfaction of determining that the nerve with the ganglion on it was a nerve of sensation, and, consequently, that those of the posterior column of the spine, analogous to it in structure, were so in function." In course of time surgical pathology came in support of these inductions; and in accordance with comparative anatomy, enabled Charles Bell to proclaim confidently the two fundamental principles of his

system: 1. That nerves similar in their substance and structure, differ in their endowments and functions, as they differ in origin. 2. That the nerves owe to their roots in the great nervous centres (the brain, the cerebellum, the medulla oblongata, and the spinal marrow), their respective endowments—the one, motion; the other sensation. The independence of organs, of functions, and consequently, of phenomena, is recognised even in those complex portions of the nervous system which have, what is called, a *crossed effect* (*effet croisé*).*

* The experiments of M. Flourens establish that the cerebral lobes, the double and quadruple pairs of tubercles, and the cerebellum alone, have a *crossed* effect; that the spinal and oblongated marrows alone have a *direct* effect; and that from the combination of these different *effects*, through the combination of the lesions of these different parts, we deduce every possible case of intersection and non-intersection, of conjunction and disjunction, in paralysis and convulsions. (*Experimental Researches on the Properties and Functions of the Nervous System*). M. Flourens has also distinguished with mathematical precision the special functions and settled parts of the different divisions of the nervous system. He establishes in the cerebellum the seat of a reflected property which consists in *arranging* the motions *willed* by the cerebral lobes in which he places the seat of intelligence. According to him, the nerve only serves for the *immediate excitement of muscular contraction.* This distribution of functions he divides into three distinct endowments of the nervous system:—The first, that of perception and will, which is *intelligence;* the second, that of receiving and communicating impressions, which is *sensibility;* the third, that of producing muscular contraction, which is *excitability.* M. Flourens has newly elucidated this theory in his work on *Life and Intelligence.* M. Brown-Séquard, also, has recently discovered several new facts, connected with the subject.

But there is nothing in the new experiments of Charles Bell, we say, to set aside Bichat's division of the nervous system into two great sections,—the one embracing nutritive, the other relative life. What these experiments have especially established is, the distinct endowments and functions of each nerve; and the general arrangement of the whole system into two portions,—the one applicable to *motion*, the other to *sensibility*.

The study of the system consists in—the definition of the especial endowments and functions in the nervous filaments, the analysis of sensation and will, the determination of the true seat of perception in the encephalic centres, and the exact limitation of the part performed by all the intermediate agents in the complicated machinery of the senses. From the analyses and indications of Charles Bell, confirmed by the successive experiments of those who have continued them, physiology explains to us *materially* the inmost secret of sensitive life. It holds the key of all agreeable or painful impressions, and may be compared to the keys of a piano, every chord of which responds to the interrogating finger by a fixed vibration.

We can understand the amount of new light suddenly imparted by Charles Bell's experiments, to physiology (the study of man in health), and to

pathology (the study of man in sickness); as also, indirectly at least, to the examination of the intellectual faculties; since we have ascertained the vast influence exercised upon intelligence by the physical sensations, of which the nerves are the agents. The materialists can no longer attribute to the brain, properly so called, the special elaboration of thought; but its relative importance must always be considerable, as being one of the four great nervous centres which form the encephalon, the general boundary of sensations, and the departing point of volitions, whether these latter remain obedient to the soul, or whether—a deduction which would save much argument between physicians and metaphysicians—we admit, in co-operation with the soul, and directly emanating from the divine breath, another essence purely organic;—the vital principle of Barthez, and more anciently the *archeus* of Van Helmont.* Be this as it may, comparative anatomy, illustrated by Charles Bell's views, shows us in the scale of creation the gradual perfection of each being, measured by the perfection of his

* We should place this principle at the highest step of the hierarchy established by M. Flourens in the nervous functions, each subjected to the other, and all obeying one, that of the brain; —the exclusive residence, as he says, of all perceptions, volitions, and intellectual faculties.

nervous system. We must attribute to beings of the simplest form, some sort of nervous substance in place of visible nerves; beings of the class immediately above, possess a ganglion or small nervous centre; which, in the classes still more highly organized, becomes more and more complex, and more closely resembling the human encephalon, up to the highest step of the ladder. Charles Bell pointed out, in the progress of this study, a remarkable and poetical change in a particular class of insects;—with the development of their wings they acquire a nervous system entirely new.

To give a detailed analysis of all Charles Bell's successive papers on his system, would alone occupy a volume. They were translated into French by one of the editors of the *Revue Britannique*.* In England, his two brothers-in-law have several times given a summary of them: one of these, Mr. Alexander Shaw, in an appendix to the *Anatomy and Philosophy of Expression*, repeats how Charles Bell gradually arrived at the theory which forms the foundation of this work, and so on to the development of his grand idea. He had ob-

* By Dr. Genêt. Should this translation be reprinted, it would be necessary to bring it closer to the text, or rather to reconstruct it in part from the original papers, as revised and corrected by Charles Bell.

served that besides the two great nervous systems of sensation and motion, other nerves gave animation to the muscles, and that these latter sprang from a portion of the spinal duct distinct from the two furrows whence were detached the sensorial and motory nerves. He saw that the greater part of these nerves penetrated the muscles which produce the mechanism of respiration. Reflecting on the object of this function, he soon remarked that it was not only to vivify the blood in the lungs, but also to bestow on man the faculty of communicating with his fellows, and that of giving vent to the thoughts of his understanding and the passions of his soul; in a word, that the nerves of respiration were, and ought to be, the nerves of expression.

He called the nerves of respiration, *superadded* nerves; and the spinal nerves, the *symmetrical system;* the last being common to all animals, from the leech up to man, to discharge the functions which distinguish an animal from a vegetable,—that is to say, locomotion, sensation, and the prehension of food; while the other nerves are only *superadded* when the organization requires higher offices. Here, again, comparative anatomy reveals to us that this nomenclature is strictly in accordance with analogy in the development of the brain

throughout the entire series of animated beings; the sensorial nerves being gradually superadded in proportion as the animal ascends the scale of life. Wherever the respiratory organs exist, a system of nerves, distinct from the spinal cord, is "let in" to govern them. Such is the theoretical idea developed in this original work (the *Philosophy of Expression*), which offers to the painter and sculptor nothing less than a knowledge by which he may not only imitate, but comprehend and depict correctly, the ever-varying play of human passion.

In all his works, Charles Bell's ideas readily suggested new ones. To the discovery of the distinction of endowments in each class of nerves, has he not added the beautiful theory of the "Nervous Circle," which led Dr. Marshall Hall to his discovery of the *reflex* or *reflective* function—the basis of a remarkable volume on *The Maladies and Disorders of the Nervous System?* And does not the theory of a *sixth*, or *muscular sense*, to which Charles Bell attributes our consciousness of distance, form, texture, and of the resistance of objects, contain, in seed at least, the result of experiments since made on the principle of the moderating powers of motion?*

* M. Flourens has also a fine chapter on the mechanism of

It is thus that in Charles Bell the artist is never separated from the anatomist, nor the anatomist from the artist; and we may say that when he discovered the great law of distinct endowments in the nervous system, he was guided by that worship of the symmetry of form which makes part of the theory of the beautiful as applied equally to the works of nature and of art. It was his custom to be pre-occupied with his darling idea. In his solitary walks, under the inspiration of the pure air of the country, he repeated to himself: "Nature has fixed laws, symmetry presides over all her works, in the human body as in vegetable, and even in mineral substances. Everything is subjected to a uniform order and principle; confusion and irregularity are only apparent; where we perceive at first sight nothing but an entangled labyrinth,—a closer study, a more minute investigation, will sooner or later reveal the regular distinctions which others have sought for in vain." Then, calling the pencil to his aid, he depicted things as he saw them "in his mind's eye," as Shakspeare expresses it, and as he himself

motion, or of the pulsations of the arteries.—(*Experimental Researches on the Properties and Functions of the Nervous System*, Second Ed., p. 496.)

had conjectured. It was thus that after having successively traced on three sheets of paper the distribution of the nerves of the fifth pair, and the spinal nerves, isolated from those furnished by the great sympathetic source, by laying these three plans one upon the other, and raising them by turns, he at last demonstrated clearly to himself, and then to his pupils, the correctness of his views, and the true simplicity of the mechanism of the respiratory nerves. He demonstrated his system as follows :*—

"Soon after I began to teach in the school in Windmill-street, I made for the lecture of the following day a careful dissection of the nerves under the jaw, on the side of the neck and the side of the chest. This dissection, as every anatomist knows, presents an extraordinary confusion of nerves. That evening I had occasion to go into the country, and with my mind still full of the subject, I laboured to reconcile this apparent confusion with the principle which I had laid down, by observing the roots of the spinal nerves and the distribution of the fifth to the head. I began by

* "Why the nerves were at first divided into regular and irregular nerves." This is the title Charles Bell gives to the paragraph quoted.

laying down on one sheet of paper the nerves of double origin going out directly from their places, and distributed equally to the corresponding divisions, or regions of the body. There appeared not the slightest irregularity: each nerve had its double root; each had its ganglion on one of its roots; each nerve of the spine went out from between the vertebræ in regular succession, and the fifth cerebral nerve supplied the muscles of the jaws, the organ of taste, and the surface of the head;—so that the sheet of paper was covered with a perfectly symmetrical system of nerves;—the nerves of sensation and motion of the trunk and extremities; and of sensation, taste and mastication in the head.

"I next set myself to design the irregular nerves; and on drawing the portio dura, the glosso-pharyngeal nerve, the par vagum, the spinal accessory, the phrenic and the external respiratory, I found that I had removed what produced the seeming intricacy in the demonstration. And the very natural reflection and question rose in my mind—In what do the roots of those nerves correspond? It was impossible to miss this fact, that the chief of these irregular nerves came from a distinct column of the spinal marrow, in regular sequence; and farther,

it was evident that they went to parts already furnished with nerves possessing the properties of sensation and motion. A system of nerves of great extent, and diverging to all the parts acting together in the office of respiration, was then before me, less symmetrical than the others, but still systematic. A few experiments of my own, joined with recorded facts, soon evinced that those more irregularly diverging nerves combined the nostril, throat, uvula, and velum, the larynx, the diaphragm, and the external muscles of respiration, in one simultaneous effort."*

Before reading his various papers on the nervous system to the Royal Society of London, Charles Bell submitted them to the celebrated Dr. Thomas Young;† who, he tells us, lost all

* M. Flourens is eager to acknowledge that we owe the first *idea* of the new experiments in the exposition of *excitability* and *sensibility* in the nerves *to an admirable view* by Charles Bell. He adds that *this view is the fruit of an analysis equally profound and acute;* but he might have said with justice that, in repeating Bell's experiments, he retained the modifications suggested by his own notions. The most exclusive partisans of Charles Bell cannot, on their side, deny to M. Flourens the complete development of the experiments of the Scottish physiologist. It is to be regretted that the latter has not always imparted to his style that elegant precision which renders the system of M. Flourens so clear even to those who have but an imperfect notion of human and comparative anatomy.

† See his biography in one of the numbers of the *Revue Britannique.*

patience on hearing of the respiratory nerves of the face. Never having considered respiration as other than a chemical process, he exclaimed against the absurdity of the idea and expression.*

Dr. Thomas Young was not the only person who shrugged his shoulders, even down to the present day, when, after having ridiculed the discovery,

* "It may sound oddly to speak of the respiratory nerves of the face, of the neck, and of the shoulder; and it may be necessary to give an illustration of the sense in which the term is intended to be employed. When a post-horse has run his stage, and the circulation is hurried, and the respiration excited, what is his condition? Does he breathe with his ribs only; with the muscles which raise and depress the chest? No. The flanks are in violent action; the neck as well as the chest are in powerful excitement; the nostrils as well as the throat keep time with the motion of the chest. So, if a man be excited by exercise or passion, or by whatever may accelerate the pulse, the respiratory action is extended and increased. Instead of the gentle and scarcely perceptible motion of the chest, as in common breathing, the shoulders are raised at each inspiration, the muscles of the throat and neck are violently drawn, and the lips and nostrils move in time with the general action. If he does not breathe through the mouth, the nostrils expand and fall, in time with the rising and falling of the chest; and that apparatus of cartilages and muscles of the nose (which are as curious as the mechanism of the chest, and are for expanding these air-tubes,) are as regularly in action as the levator and depressor muscles of the ribs.

"It is quite obvious that some hundred muscles thus employed in breathing, or in the common actions of coughing, sneezing, speaking, and singing, cannot be associated in action without cords of connexion or affinity, which combine them in the performance of these motions. The nerves which serve this purpose, I call *respiratory nerves*."—CHARLES BELL, *Nervous System*.

some unbelievers pretended that it was already old; while others found it so simple that they candidly avowed their astonishment at not having made it themselves. Professor Abernethy was one of the latter, as he himself admitted in a letter to Charles Bell: "I will not delay thanking you for the early satisfaction you have given me by the perusal of *your paper on the respiratory nerves*. Having read it, I said to myself, what stupid chaps we have all been not to think of this before."*

This was almost the history of Columbus's egg.

Charles Bell was very near being really forestalled in France by a physiologist who, having received

* Sir Charles Bell relates the same fact, more in detail, in the text of one of the oral lectures reprinted in the form of justificatory pieces at the end of his papers read before the Royal Society of London, and inserted in the series of *Philosophical Transactions*. In the following lecture he expounds his first experiments nearly in the same terms as in the *Historic Note*, which M. Flourens believes was only ascribed by Charles Bell to one of his pupils *for the convenience of discussion*. Charles Bell very naturally reprinted this note in his volume, as it is in fact a reply to M. Magendie, while serving a double purpose in regard to his own lecture. In the *reply*, as in the *lecture*, he repeats that M. Magendie wrongfully claimed the discovery of the fact that the retina was insensible to pain, since this fact had been cited by him in 1814 as one of the proofs that the nerves are endowed with distinct properties corresponding to the difference of their degrees; consequently, it becomes impossible to consider the brain as the source of one common nervous influence. M. Flourens publishes only an extract from the note attributed by Charles Bell to one of his pupils.

from Bichat "the torch of experimental art," according to the expression of M. Flourens, had commenced by a criticism on Bichat himself, reproaching him with being misled by the hypotheses of his imagination. When this physiologist, M. Magendie, "indefatigable in labour, bold in research, and caring nothing for any sect, either of materialism or vitalism," was compelled to admit that Charles Bell had at least the advantage over him of priority in the discovery, he made his reservations with the tone of a man who, as M. Flourens also observes, "having consecrated himself wholly to physiology, had seized upon that science as private property." Thus, after having disputed the correctness of Charles Bell's experiments, at the risk of contradicting himself, M. Magendie pretended to have completed them, and placed his share of the credit under the protection of nationality. Denying that Charles Bell had *foreseen* the distinct properties of the roots of nerves, under the pretext that this distinction did not emanate from the experiment cited in support of it, "it is therefore in reality my work," said M. Magendie, "and ought to subsist as one of the columns of the monument erected since the commencement of this century by *French* physiology!" A

tolerably emphatic formula from the same pen which, denouncing such words as *heart*, *arteries*, and *veins* as too poetical, chose to write simply "the central pump, the greater and lesser tubes of circulation!"

I shall probably be set down as an Anglomaniac in physiology, but I leave my opinion under the protection of the humanitary sect, although I have not the honour of being one of their members.

The scholar has a country, but science is a cosmopolite. Its advancement adds to the common fund, and benefits human nature at large, without national privilege; and nothing can be more just, as there is scarcely a discovery in the sciences we call inductive, of which it cannot be said that it has not been matured by the successive labours of the explorers of all countries, who, collectively and individually, from age to age, pursue the same object, and transmit the light of observation from one to the other. Patents of invention, nevertheless, exist in these sciences, but purely honorary, although the question of priority sometimes excites private and even national quarrels, which, happily, never proceed so far as a prosecution or a declaration of war, which requires between personal com-

petitors the enclosure of the lists, or between states the conquest of an island. It might perhaps be different if we had an English and a French astronomy, an English and a French physiology, as we have English and French astronomers and physiologists. Up to the present day we have disputed the discovery of a star, a gland, or a nerve, without the intervention of advocates and armies. The new star, gland, or nerve has perhaps two names instead of one; but the star shines in the heavens for the whole world: the gland and the nerve peaceably continue their functions in the body of the ignorant peasant, as in that of the erudite philosopher.*

Although naturally proud of his discovery and jealous of its being attributed to others, Charles Bell never attempted to deny what he owed to his contemporaries and immediate predecessors, going even almost to the length of acknowledging that he considered it the revival of an idea of John Hunter, his illustrious countryman, in whose

* Necessarily, I only mean to speak of the *principles*, and not of the *instruments* of a science, even when these instruments could not have been invented except by the application of the principles of the science. Thus, Holland has a right to claim for Hans Lippershey the invention of the telescope (1608), although Galileo produced in his turn (1609) the instrument that bears his name, and which, in several modifications, differs from that of Lippershey.

chair he was destined to sit at a later period, in the College of Surgeons at London. This is proved by a note in his Memoir on the nerves of the eye.

The historical panegyric of F. Magendie, delivered by M. Flourens on the 8th of February, 1855, at the annual session of the Academy of Sciences, is followed by a discussion on the respective claims of Bell and Magendie. M. Flourens, in a note, quotes, with favourable mention that does me honour, my first biographical sketch of Sir Charles Bell, which had also been quoted by M. Magendie himself, although during the life of the latter I had avoided the necessary detail on the question that chiefly interested him. It was no part of mine to renew a controversy in which, from want of authority, I might have compromised the rights I attributed to the English physiologist. M. Flourens, a competent judge in the case, stepped in fortunately to close the scientific debate by discussing the relative share of each. According to him, the honour of priority in the discovery belongs to Charles Bell, and the credit of completion to M. Magendie. To the first, the parent idea; to the second, an analysis more delicately developed, "equivalent to a new dis-

covery;" the one having established before the other, the fact of the distinction of respective functions in a nervous filament in which the nerves of sensation and motion are intermingled; and the other, having by his multiplied experiments traced the two principles to their roots, explaining at the same time with more precision the problem of *exclusive action*, combined with the sensibility of borrowing or returning what the motor nerve receives from its congener. It is after having verified himself all the experiments of M. Magendie, that M. Flourens pronounces a mature and elaborate judgment which must be quoted textually. "These experiments prove," he says, "first, that the *posterior root* of the nerve is exclusively and essentially sensitive—I say *essentially*, for though you cut the *anterior*, the sensibility of the posterior is not affected; secondly, that the *anterior root* is essentially *motive*—essentially, for if you cut the *posterior root*, the anterior still retains its power of motion. And, on the contrary, the *anterior* root is not essentially sensible, for if you cut the posterior, its sensibility ceases. It is, therefore, not sensible in itself; it is only so through the other, and so exclusively, that if, leaving that other (the *posterior* root) intact, you

cut the anterior—of its two ends the one which attaches to the posterior alone retains sensibility."

What M. Magendie has determined with a precision still further verified by M. Flourens, is, that the *sensibility* of the *anterior root* flows to it from the *posterior root;* and that this return commences at the fixed point where the two distinct nerves, those of motion and feeling, unite and intermingle their filaments. It is thus that M. Magendie himself defined *recurrent sensibility:* "If we lay bare, with proper precautions, a pair of rachitic nerves, we discover that both roots are *sensible*, but from different causes. In the posterior roots, the nerve of sensibility is in the centre and expands itself to the circumference. In the anterior roots, on the contrary, the origin of sensibility is in the periphery, and diffuses itself towards the centre. For this reason I give to the last the name of *recurrent sensibility!*"

I had expressed my regret* that M. Flourens, to whom we are indebted for such a brilliant parallel of Cuvier and Geoffroy Saint-Hilaire, and of Cuvier and Blainville, had not included in the plan of his historical eulogism on M. Magendie a parallel between him and Charles Bell. He re-

* *Revue Britannique* for March, 1858.

plied to me in the *Journal des Savants*,* by again bringing together these two eminent men, both so honest under different aspects, and presenting such a curious contrast in the history of their labours, governed, as each was, by the spirit of original genius. "The one more meditative and reflecting, the other a man of action rather than of thought; the one looking upon experiments as a subordinate but necessary aid, the other regarding ideas as superfluities; the one probably would never have tried experiments had he not previously conceived ideas, the other, perhaps, would never have conceived ideas had he not begun by multiplying experiments."

In the Academy of Medicine, M. Magendie has been judged with more severity, in certain respects, than in the Academy of Sciences.

Academical panegyrics seem, for some time, to have departed more and more from the tone of those sublime fictions of the Christian pulpit which are called funeral orations. When a prince of science, of philosophy, or of literature dies, the orators, officially or academically appointed by the Institute to pronounce his eulogium, condemn while praising him, with sometimes as much

* April, 1858.

severity towards the lauded and criticised defunct as the Egyptian priests manifested for the Pharaoh they dissected and embalmed in the pyramid of Cheops. The very successor to the chair, the inheritor of the vacated honours, feels bound to inflict a few delicate incisions of the knife, while he infiltrates the balm into the veins of the dead body. This can scarcely be called a forced metaphor when applied to an anatomist like M. Magendie, whose scalpel spared neither life nor death in man or animal. His colleague who pronounced his panegyric in the Academy of Medicine, M. Dubois d'Amiens, was more explicit than the permanent secretary to the Academy of Sciences, in giving judgment on the dispute between the French and the Scottish physiologist.

"People are in the habit," said M. Magendie, "of associating my name with that of Charles Bell. I believe I should gain much more if they were kept distinct." To this, M. Dubois d'Amiens replies: "The distinction is not easily made. The discovery, as announced by Charles Bell, in 1811, was *positive* and *complete;* one last and *superabundant* demonstration alone was wanting—an experiment on a living subject. Now, this, M. Magendie has achieved." Perhaps M. Dubois

ought to have qualified this conclusion by enumerating the pathological cases through which Charles Bell sufficiently demonstrated his discovery. He seems to say that M. Magendie was the first to see with the "physical eye" what Charles Bell had only seen with the "eyes of his mind."

Charles Bell himself, while defending his right of discovery against the pretensions of M. Magendie, thanked him for having spared him the final experiments which completed its unanswerable demonstration. He was never one of those who at one time disputed the correctness of those experiments, and at another triumphed in the slight contradictions into which his French rival sometimes fell, while himself complicating the problem of his researches. He would have applauded the equitable division of honour established between M. Magendie and himself by M. Flourens—a more just award than that of M. Dubois d'Amiens, who reduces Magendie to the second rank: "A distrustful and sagacious observer, a skilful and unsparing operator, M. Magendie applied himself exclusively to the verification and establishment of the particular facts enunciated by science. Entirely devoted to this labour of proof

and demonstration, he has not, it is true, made any important discovery in physiology, he has not laid down any new law; but he has thrown such light upon facts hitherto placed in obscurity, he has given so much certainty and positive evidence to other facts little known or understood, that he may justly inscribe his name by the side of those of the inventors, and on these grounds we may forgive him for having sometimes endeavoured to appropriate their reputation."* More could not be said in England, where the glory of Charles Bell, long under discussion, is at length claimed as national property.

M. Dubois d'Amiens attaches little importance to *recurrent sensibility;* he sees in it a mere illusion, of which nothing more need be said; and it is fortunate for the physiological credit of M. Magendie, that still more recently M. Flourens has confirmed by his own experiments the phenomena which a minute and delicate analysis can alone establish.†

* Panegyric on M. Magendie by M. Dubois d'Amiens.

† The experiments of M. Flourens were repeated in conjunction with M. C. Bernard; it is therefore difficult to believe, with their opponents, that such eminent physiologists could *delude* themselves as to *pretended* filaments, *sensitive and recurrent.* The effects of galvanism upon the nerves claim, also, the entire attention of scientific men. Messrs. Longet, Matteucci, Brown-

Let the case be as it may with regard to this last detail, I repeat, with a safe conscience, to Charles Bell belongs the original idea, and the system also, no matter what additional developments have been made to it while he was alive, or since his death. The physiology of the nervous system is his work. With the natural laws he was the first to reveal, are connected (we should say spontaneously, like the texture of the nerves with their roots,) all the experiments and discoveries which have confirmed and consecrated them beyond the reach of future discussion. The greater part of these experiments were his own, or carried out by is pupils under his eyes. If he has not multiplied dissections, like others, has he not supplied their place by clinical practice? We ought to remember in the fourth edition of his papers read to the Royal Society, the list of the pathological cases there commented on. Amongst these numerous instances, some belong to his personal practice, and others are furnished by his professional brethren in England, France, and Germany —the concurrence of some of the most illustrious

Séquard, Dubois-Raymond, Hemholtz, Valentin, and Kölliker have multiplied experiments which I can only refer to.—(See a note in the *Appendix*).

of modern masters proving thus that Charles Bell, by their avowal, has modified and reformed surgical practice in a host of cases, such as paralysis, convulsions of the face, and affections of the tongue and eye. He would have been the first to perform the modern operation for *strabismus*, in 1813, if he could have found a squinting monkey, which his brother-in-law, Mr. John Shaw, searched for in vain; for he never could be induced to make the first experiment on a human subject. In default of a squinting monkey, he found one on whom he tried the section of the facial nerve.

"The poor animal," says M. Dubois d'Amiens,* "began to grimace with redoubled energy, but entirely on one side of his visage, the other remaining quite motionless. No one, assuredly, could have thought of practising this experiment upon a human being, but nature took it upon herself. All who were admitted to see the monkey operated upon by Charles Bell, were struck with the strange analogy its physiognomy presented with that of an actor then in high repute in London, who could at pleasure express every variety of passion on one

* I might have noticed several analogous cases in the *Justificatory Operations* of Charles Bell, but the text of this has escaped me.

side of his face, while the opposite half exhibited no emotion whatever. Charles Bell's experiment supplied him with a clue to the enigma. It was found that this comedian, struck by facial hemiplegy, in consequence of an accidental injury to the motory nerve, simply availed himself of a natural infirmity."

It is therefore not sufficient to say of Charles Bell, that he had an admirable *view*, or the *view* of a *man of genius*, as if he had only one, and that adopted at hazard. A similar compliment was addressed also to a great poet, Goethe, with respect to his system of vegetable morphology, or the metamorphosis of plants. But he was not content to have it said that he made this discovery through a sort of poetic instinct, from his natural love of the beauties of form, from imagination alone. When he explained it to Schiller, as he himself relates, he drew a symbolical plant, to make him more readily comprehend the successive transformations of the leaf into a stamen, a pistil, a bractea, a petal, a corolla, &c. "What a beautifully poetic idea!" exclaimed Schiller. On hearing this, Goethe was unable to restrain his vexation, and as if to reproach his illustrious rival for having conceived such an idea, reminded him that he

devoted more time to the study and cultivation of botany than of poetry.* It has been said also that, in a cemetery in Venice, and while philosophizing over the head of a corpse, like Hamlet with Yorick's skull in his hand, Goethe conceived the first idea of his osteologic type, a system admitted and developed by Professor Owen, who reduces the human cranium to a simple expansion of the vertebral column. Poets only adopt such ideas as these after they have studied comparative anatomy, as Goethe did in the Duke of Weimar's cabinet of natural history.†

Sir Humphrey Davy was unquestionably a man of imagination, a poet in prose and even in verse; but if he had not been pre-eminently a great chemist, would he have advanced the hypothesis that "chemical and electrical attractions were produced by the same cause; acting in one case on small particles, in another on vast bodies; and that the same property, under different modifications, was the cause of all the phenomena produced by voltaic

* Linnæus had at least caught a glimpse of the morphologic doctrine which owes its development to the professor of Candole.

† It was in 1795 that Goethe published his sketch of an introduction to comparative anatomy, commencing with osteology. See the works of Spix, Oken, Owen, &c., and the papers of Geoffroy Saint-Hilaire,—amongst others, that called *Composition of the Cranium in Man and Animals.*

combinations;"—an hypothesis which passed from a conjectural assertion to the affirmation of a positive discovery, and was followed by the decomposition of earths and alkalies?*

The philosopher Reid said, "The man who first discovered that cold freezes water, and that heat transforms it into vapour, proceeded on the same method and on the same principles by which Newton discovered the law of gravitation and the properties of light. His *Regulæ Philosophandi* are maxims of common sense practised in every-day life; he who philosophizes upon other rules, whether as regards the material system or the immortal soul, will fail to reach his end."†

Charles Bell is neither the author of a single discovery, nor the writer of a single book (*auctor unius libri*).

* "The confirmation of the discoveries of Davy by Faraday is," says Professor Whewell, "analogous to the confirmation of the views of Borelli and Hooke upon gravitation, or to that of the undulatory theory of Huyghens by Young; so true is it that all great discoveries depend on the combination of *exact facts* with *lucid ideas*." "For," as the same historian of inductive science asserts, further on, "the operations of intelligence, as well as the confirmation of the senses, are necessary to arrive at all knowledge whatever, and all the great advances of science require from him who makes a discovery a special clearness and vivacity of thought." —*History of the Inductive Sciences*, vol. iii.

† *Inquiry into the Human Mind*—Introduction.

A German physiologist, Valentin, has given the name of *Lex Belliana* to the principle of the distinct functions of the two roots of a nerve, to commemorate thus the leading claim of Charles Bell as a physiologist.

His theory of the laws of the circulation of the blood is not, perhaps, as exclusively his own property, but it was not without foundation that he quoted the essay in which he places it on an equality with his publication of 1811. To pass over this little work in the history of his labours would be to become an accomplice of those English and German physiologists who have also constructed an *original* system upon the same arguments. To describe it to others who, without knowing it, have adopted and developed the same idea, is to add fresh authority to their deductions. The *Essay on the Forces which circulate the Blood*, published in 1819, is dedicated to Mr. John Abernethy ; and in the dedication Charles Bell does not conceal that he agrees with the doctrines of that professor, in opposition to those of his colleague Lawrence, who, in his *Physiology*, had become the interpreter of the French philosophers of the school of Helvetius. As materialism was making daily progress amongst the English students, he thought

that, even in the investigation of physical man, we might find conclusive demonstration of the existence of an immortal soul: "A man endowed with this modesty, the stamp of true science, may feel himself overpowered before the immense horizon of the aspects of nature. The wonderful revolutions studied by the geologist, and the incomprehensible grandeur of the celestial bodies moving through infinite space, force upon him a humiliating reflection on his own littleness. For him, the earth and its inhabitants are nothing more, as Bacon says, than an ant-hill, where some ants carry a grain of corn, some their eggs, and others nothing, passing and repassing on a heap of dust. He hesitates to believe himself the special object of Divine care; but when he examines minutely the structure of his own body, he learns to look upon space and magnitude as nothing in the eyes of a Creator, and acknowledges that the living being he was on the point of despising, in comparison with the vast scheme of the universe, exists by the act of a power not less wonderful than that which governs the celestial bodies. He finds again in his physical composition, in this microcosm of the human body, a circle of motion as surprising as that in the planetary system; for there is not a globule in the

circulation of the blood which is not regulated by a law of attraction as marvellous as that which confines the stars within their orbit."

This law of attraction in fluent molecules is explained by Charles Bell in the first part of his treatise;—the theory of all the movements of the blood, the graduated measurement of their ultimate speed and slowness, and the relation of solids and liquids; but always requiring the complete subordination of every physical and chemical phenomenon in circulation, to a vital principle; an influence too much forgotten by those physiologists who, reversing the Scotch proverb, "Blood is not water," refuse to see anything more in the mechanism of circulation than a hydraulic machine, which brings or returns, propels or drives back, elevates or depresses the stream of a fountain, scarcely taking into account the coagulation and other transformations undergone by this liquid, which possesses its own vital attraction, independently of the propulsion it receives from the heart and the arterial or veiny canals.

The second part analyses the forces of this propulsion of the heart and arteries—a double and distinct propulsion, ultimately reducing and increasing, in a remarkable degree, the velocity of

the blood in its assigned track. The mechanical part belonging to the heart is perfectly circumscribed. Charles Bell refutes those who attribute to it the entire force of propulsion, by citing cases in which circulation has been only moderately expressed in consequence of ossification, or the adherence of a tumour which entirely enveloped the heart and paralysed its proper motion. The action of the arteries is doubled in the organs at the greatest distance from the heart, and which from that cause derive additional support to their conformation, often forcibly bent down. In no case are they "large or small tubes, more or less elastic," as M. Magendie persuaded himself, but organs endowed with the powers of elasticity and contraction; in short, with the properties of life.

"The arterial tree," says Charles Bell, "offers the most simple explanation of the forces which make the blood circulate. We see these branches of different lengths and curves, which consequently receive the flow from the heart with different degrees of strength. But this inequality is corrected by the inherent power of these branches, for possessing a special action according to their length, they equalize circulation by giving to every part of the body, whether near to or distant from the

heart, its proportionate force of circulation. If the part to be supplied with blood is close to the heart, the impulsion of the heart increases; if removed from it, the impulse is conveyed by arterial contraction."

In the third part of this essay, Charles Bell examines the immediate consequences of exercise upon circulation, the special use of the valves of the veins, the action of the muscles, the double duties of the respiratory apparatus; and concludes his analysis of all the forces co-operating in circulation, by defining more explicitly the function of the heart, which he confines, we say, to that of being pre-eminently the regulating organ in the division of the sanguinary fluid. "In fact," he resumes, "when we remember that the blood of certain creatures circulates without the heart; when we see acephalæ born without that organ, and yet nourished with blood; when we behold the aortic system of fishes almost entirely withdrawn from the influence of the heart; when we find that the heart of every animal is placed in juxtaposition and in exact sympathy with the lungs, it is impossible not to admit that the arteries contain the principal force which makes the blood circulate throughout the system, and that the

heart is rather the regulator than the primary and efficient cause of circulation."

In his study of the system of circulation, as in that of the nerves, Charles Bell was necessarily compelled to make more than one experiment in comparative anatomy; but he abstained as much as possible from torturing animals, which he considered, in most cases, a useless act of cruelty, less certain in result than was commonly supposed, and less profitable than an attentive study of pathological phenomena; because vivisection not only alters the substance of the mutilated organs, but disturbs, more or less profoundly, the natural condition of life, and excites, through pain, irregular motions differing from those expected or previously observed, &c. He admits that such is not the opinion of some of the best and most virtuous men he has ever known, but that for his own part he never could convince himself either by the experiments he witnessed, or by any of those related to him.

Will M. Flourens permit us to observe, with reference to this declaration, that he seems to have gone a little too far in a note in which he isolates another phrase of Sir Charles Bell:—"*Experiments* have never led to discoveries?" M. Flourens

attributes to him a decided prejudice against experimental art. Charles Bell had no absolute objection to experiments upon living animals; but, according to his idea, they were insufficient without the concurrence of anatomy and human pathology.*

Charles Bell was not satisfied, like Magendie, with simply endowing the arteries with elasticity. The muscular force appeared to him distinct from the elastic force, because it possessed a vital property of motion. The muscular fibre, he said, ceases to be either irritable or contractile when life stops, whilst elasticity remains in the dead fibre. He quoted the elasticity of a harp-string: "Suppose this string extended so as to vibrate in a fixed time—to re-echo a true note. If you strike it violently it loses tone, or becomes relaxed and incapable of vibration. This does not occur in the living fibre, for that contains within itself a restringent property. It is its own tuner; it recovers its elastic power spontaneously; internal life repairs the excess of its effort and exercise. Take, again, a steel spring, highly tempered, which

* Such is the opinion expressed by M. Brown-Séquard, in a course of lectures on the Physiology and Pathology of the Nervous System, delivered in May, 1858, before the Royal College of Surgeons in England.

rebounds and vibrates throughout its whole extent. It will not resist a certain degree of straining any more than the string of the harp, and to restore its lost elasticity you must re-temper it and heat it again up to 500 degrees of Fahrenheit. Life alone can give new tension to the fibre which has ceased to be elastic; but the mechanism of life requires to be kept up by constant exercise. If by some accident a member is condemned to inaction, the muscular force rapidly declines, it loses its spring and elastic resistance; bones, tendons, and ligaments decline with it.*

Although Charles Bell linked his *Essay on Circulation* to a physiologico-philosophic quarrel, which violently agitated the College of Surgeons in London, and even reached Parliament, he remained almost without notice amongst the obscurest champions of the fight, and at the end of forty years his pamphlet is still in its first edition. His hour had not yet arrived, and he was compelled to content himself with disseminating his idea upon the arterial, as well as that upon the nervous system, amongst his private pupils.

But whatever degree of enthusiasm he felt when

* This subject is merely alluded to in the *Essay on Circulation*. Sir Charles Bell refers the reader to his *Essay on Animal Mechanism* and his *Treatise on the Hand*.

a sudden inspiration seized him, or experiment confirmed his deductions, he sometimes lost all traces of it, and his friends or pupils more than once, by their notes, restored to him ideas and discoveries which he would otherwise have inevitably lost. This defect of memory never led him to appropriate the ideas and discoveries of others, a practice which would have obtained no pardon, however prodigal he had been of his own, and despite the candour with which he shared reputation with those who seconded him in his experiments, or assumed them as a basis for further advances. Thus, he had no thought of claiming the idea of the "reflex function" of the spinal marrow, discovered by Dr. Marshall Hall, while pursuing his researches on the nervous circle, and which furnished the text of one of the papers he read to the Royal Society. Naturally, too, he might have borrowed from his own early works, comparatively obscure and unnoticed as they were, without taking care on all occasions to signify to the reader that he had done so, and without the risk of being accused of repetition. Certain paragraphs from another treatise, almost as little known in France as the *Essay on the Forces which circulate the Blood*, justify this remark.

Judging by the number of editions, none of Charles Bell's works were as popular as his *Treatise on the Hand*, which in the biography of his labours is what the *Researches on Life and Death* are in that of Bichat. Neither of these physiologists may fear the juxtaposition of their names; but Charles Bell here reminds us of Haller rather than Bichat, by a more extensive application of comparative anatomy to physiology. Bichat contented himself with a few experiments on the animals approaching the nearest to man, while Charles Bell analysed comparatively even to the osteology of the antediluvian creation, faithful to the theory of *final causes* laid down by Cuvier, and explaining it, like him, by the law of *organic correlation* and the *conditions* of existence which have preserved the immutability of species through the successive revolutions of the globe. But it is in this work pre-eminently that Charles Bell, as a spiritualistic physiologist, proclaims in every page the pre-existence of a universal plan realized by creation, and the work of a supreme intelligence. All is rendered subordinate to this sort of programme, as the programme itself is drawn up in accordance with the origin of the book.

Francis Henry, Earl of Bridgewater, by his will,

dated the 25th of February, 1825, left the sum of eight thousand pounds sterling to be given to the author of a work *On the Power, Wisdom, and Goodness of God as manifested in the Creation.* The testamentary executors of the Earl, believing themselves authorized to interpret his intentions, preferred calling for eight different treatises from the same number of writers, selected from amongst the theologians, members of the Universities, physicians, geologists, naturalists, chemists, &c., who would each, as a matter of course, consider the subject from the point of view of their particular studies. Charles Bell had already written, in association with Lord Brougham, a commentary on the *Natural Theology* of the Rev. Dr. Paley, and an *Essay on Animal Mechanics.* From 1813, he had amongst the auditors to his lectures on anatomy and physiology, the Rev. Mr. Rennell, who had been much edified by his doctrines, and had sometimes quoted him in his own writings, in his official duties at Cambridge as *Christian Advocate.** Bell was therefore at once included in the list of eight, admitted to a participation in the legacy, and his *Treatise on the*

* This functionary of the University is especially charged with the defence of orthodox doctrines.

Hand fully justified the election; a double tribute to his claims as a physiologist and his religious principles.

Charles Bell commences by placing himself within the vast horizon of comparative anatomy, and to demonstrate the perfection of structure in a single organ, he studies all the varied beings endowed with an equivalent, modified according to the conditions of their existence, the necessities of their nature, the medium within which they live, &c. &c.; the same systems being recognisable in each, the same creative power having presided over the successive revolutions of the globe they inhabit, as over the forms and adaptations of living and organized matter. The contemplation of the human body in its different relations leads him to say that, as the magnitude of the earth determines the strength of our bones and the power of our muscles, so must the depth of the atmosphere determine the condition of our fluids and the mixture of the blood-vessels. "The common act of breathing, the transpiration from the surfaces, must bear relation to the weight, moisture, and temperature of the medium which surrounds us. A moment's reflection on these facts proves that our body is formed in a just correspondence to these

external influences; and not the frame of the body only, but also the vital endowments and the properties of the organs of sense. It were a perverseness to say that the outward senses, the organization, and the vital properties could arise from the influence of the surrounding elements, or out of matter spontaneously. They are created in accordance with the condition of the globe, and are systematic parts of a great whole."

Charles Bell is not less ingenious in the analysis of details than exalted in his general views. A minute anatomist, and an original physiologist, examining all the laws of mechanics, explaining all the phenomena of life and motion, he investigates their concurring forces, without ever forgetting the first great cause of all things, and the final destiny of the favourite of creation. While comparing the structure, the organs, and vital endowments of man and animals, while establishing the numerous relations of living beings, he maintains amongst them the essential line of demarcation, which shows us "man alone capable of reason, affection, gratitude, and religion, sensible to the progress of time, conscious of the decay of his strength and faculties, of the loss of friends, and the approach of death."

It is chiefly in the tenth chapter, where he recapitulates what he has said before, that Charles Bell demonstrates to us, that whatever may be the mechanical perfection of the hand to execute all that intelligence suggests, it is not in the possession of this supple instrument that the superiority of man is comprised. This was the opinion of Anaxagoras, but Charles Bell opposes to him the more philosophic definition of Galen, who says, on the contrary, that God has given man his hands as the attribute of a creature endowed with faculties which teach him how to use them: "Non enim manus ipsæ homines artes docuerunt, sed ratio. Manus autem ipsæ sunt artium organa, sicut lyra musici et forceps fabri."*

As the author of the *Anatomy for the Use of Painters*, Charles Bell does not forget to speak of the hand as one of the instruments of expression, by quoting some of the great artists who have most faithfully interpreted this mute language. "Who, for example, has not been sensible to the expression of reverence in the hands of the *Magdalens*, by Guido; of those in the *Cartoons* of

* It is his reason, and not his hands, that have taught the arts to man. The hands are the organs of the arts, as the lyre is of the musician, or the pincers of the smith.

Raphael; or the significant force of those in the *Last Supper*, by Da Vinci? In these great works may be seen all that Quintilian says the hand is capable of expressing." "For the other parts of the body assist the speaker, but these, I may say, speak themselves. By them we ask, we promise, we invoke, we dismiss, we threaten, we entreat, we deprecate, we signify fear, joy, grief, our doubts, our assent, our penitence; we show moderation, profusion; we mark number and time."*

In the *Treatise on the Hand*, Charles Bell develops the subject of one of his preceding papers, his theory of the muscles, of which he makes a sixth sense, distinct from touch; for this external sense, more perfect and more extensive in man than in animals, always active and voluntary, is but an auxiliary to that instinctive consciousness with which the muscles seem to be endowed, and which might be ascribed to a special action of the nerves. "*Between the brain and the muscles there is a circle of nerves; one nerve conveys the influence from the brain to the muscles,*

* *Nam cæterœ partes loquentem adjuvant, hæ, prope est, ut dicam, ipsœ loquuntur. His poscimus, pollicemur, vocamus, dimittimus, minamur, supplicamur, abominamur, timemus; gaudium, tristitiam, dubitationem, confessionem, pœnitentiam, modum, copiam, numerum, tempus ostendimus, etc.*

another gives the sense of the condition of the muscles to the brain. If the circle be broken by the division of the motor nerve, motion ceases; if it be broken by the division of the other nerve, there is no longer a sense of the condition of the muscle, and therefore no regulation of its activity." In a note, Charles Bell declares that he cannot admit the hypothesis of a circulating fluid which proceeds from the brain under the sheath or neurilema, because if you touch the extremity of a motor nerve, separated from the brain for several days, the muscle is excited as when the nerve was just divided. The property, however it may be defined, is therefore in the nerve. As to the instinctive consciousness of the condition of the muscles, he thinks it may be affirmed from the effects of excessive exercise or lassitude. "We can judge the weight of a body by the hand. What is this, if not a measurement of muscular force? We are sensible to the smallest modifications of the exercise of the muscles, and this supplies a means of knowing the position of the body and members when we have no other. If the rope-dancer measures his steps by the eye, on the other hand, the blind man can balance his body without the sense of sight. In standing,

walking, or running, every effort of the will which impresses motion on the body is governed by a sentiment of the state of the muscles, and without this sentiment we should be unable to regulate their action."

It was thus that Charles Bell expressed himself in his first paper on the *Nervous Circle*, and this is precisely what he develops in the chapter of the *Treatise on the Hand* devoted to the muscular sense, to which he might also have assigned the name of the *sense of equilibrium*, since it is owing to this property that the muscles maintain the erect position of the *living* statue, without which it would bend under its articulations, or would stiffen vainly upon its pedestal like the most perfect statue of Phidias. The muscular sense, still hesitating and uncertain in the child, acquires from repeated essays the consciousness of its invisible balancer, and ends by becoming so confident of itself, that even the blind man can walk in a direct line without the aid of sight, by merely groping to ascertain whether he has a beaten track before him.

"In truth, we stand by so fine an exercise of this power, and the muscles from habit are directed with so much precision, and with an effort so slight,

that we do not know how we stand. But if we attempt to walk upon a narrow ledge, or rest in a situation where we are in danger of falling, or balance on one foot, we become subject to the apprehension of a child when the nurse, placing it on the floor for the first time, signs to it to come towards her. The consciousness of this muscular endowment survives even the amputation of a limb, in which the person still feels pain, cold, heat, &c."

Sir Charles Bell has, therefore, completely defined the functions and phenomena of the muscular sense. He has even devoted a paragraph to the *pleasures* derived from it. But he has not determined its seat, the special organ from whence it emanates. The experiments of M. Flourens appear calculated to complete the definition by localizing this sixth sense, if it be a sense, or this instinct, if it be only an instinct, in the cerebellum, which he calls the co-ordinate organ of motion.* The lesions of the cerebellum disturb

* The difficulty lay in attributing a special organ to this sixth sense, which is extended, like touch, over almost every part. Haller, and before him Glisson, had endowed the organized fibrin, the element of the muscle, with a property called successively *irritability* and *contractility*, quite distinct from the property of *feeling*, restricted to the nerve. M. Flourens is the first who has localized the function which presides at the concordance of our separate motions into one conjoined motion.

the harmony of motion; its excision and entire ablation destroy all equilibrium; the animal staggers as if it were drunk; he retreats when trying to advance; he falls while endeavouring to preserve his balance, either in walking or in standing still. The function of the cerebellum is demonstrated as regards animals. But man has not been subjected to these experiments like rabbits and pigeons. Pathology alone could not tell us whether there is a perfect identity here between the human and animal creation. The congenital absence of the cerebellum has been quoted in the history of rare cases. The individuals who were deprived of it seemed able to supply, by some unusual organ, its share of action, whether in the co-ordination of movement, or in the instinct of the reproductive function, of which, according to Gall and the phrenologists, it is the exciting organ.

The *muscular sense* is disputed by several physiologists in England as well as in France, under the pretext that they are the nerves of common sensation which fill the functions of this assumed sixth sense.

Charles Bell could not acknowledge *common sensibility;* for the first law of sensation is that

the first excitant is not able to produce the same sensation in all the organs, or in all parts of the same organ. Every organ, according to him, receives a special sensibility from its nerves appropriated to a particular sense, and to distinct functions; but whatever may be the delicacy of the tissue, it remains relatively insensible to certain impressions; thus, the nerve of touch, which, in the skin, alone gives the sense of contact, is insensible to light or sound, as the retina is insensible to touch. "The pain experienced in the eye from the irritation of dust depends on a distinct nerve from that which bestows vision. When the surgeon performs the operation of couching for cataract, and the point of the needle passes through the outer coat of the eye, it gives the sensation of pricking, which is an exercise of the nerve of touch; but when the needle passes through the retina, which is the expanded nerve of vision, and forms the internal coating of the eye, it gives the idea of a spark of fire."*

In one of his poetical lamentations on his blindness, Milton regrets that the precious sense of sight was confined to so small an organ as the eye,

* *Treatise on the Hand.*

and he asks why God had not expanded it like that of touch over the whole surface of the body,

"As feeling through all part diffused."*

A common, uniform sensibility would expose our organs too cruelly; their distinct sensibility assists preservation. The exquisite tenderness of the retina expanded over the skin would amount to positive torture: the comparative insensibility of the skin transferred to the eye would expose it to frequent contacts which would speedily destroy the sensibility suitable to vision.

Taking living existence in the mass, throughout the vast horizon of comparative anatomy, "joining to observation and experience the not less delicate and productive art of consistent comparisons, guided by a philosophic spirit springing from, and even superior to, science itself, the author of the *Treatise on the Hand* has laid down all the great questions of life, studied not only in each particular being, but considered as a constitutive element." I have borrowed M. Flourens's wide definition of the physician-physiologist to apply it to Charles Bell. To justify this application I shall add that,

* "That she might look at will through every pore," Milton adds, who puts this apostrophe in the mouth of Sampson when a prisoner to the Philistines (*Sampson Agonistes*).

in this same work, the title of which seems to promise so little, Sir Charles Bell, by enlarging his subject and by considering man as an epitome of the universe, has "ventured to unravel and follow those profound ties which unite the history of life to the history of the globe; he sees both develop themselves by a common evolution; this concerted progress reveals to him unity of design, and to apply an eloquent saying of the Roman orator, he almost grasps the great power which rules and arranges all: *Ipsumque cuncta moderantem et regentem pene prehenderet.*"

To demonstrate the perfect structure of a single organ, Bell studies it comparatively in every being endowed with it, modified according to the conditions of their existence, the wants of their nature, the medium in which they move; and he finds the same system repeated in each, the same creative power presiding from the beginning over the successive revolutions of the earth, and the forms and adaptations of living and organized matter. The contemplation of the human body in its varied relations leads him to say that the magnitude of the earth determines the strength of our bones and the power of our muscles, as the depth of the atmosphere determines the conditions of our

fluids and the resistance of the blood-vessels. "The common act of breathing, the respiration from the surfaces, must bear relation to the weight, moisture, and temperature of the medium which surrounds us. Our body is formed in exact correspondence with all these external influences; and not only the frame of the body, but also the vital properties of the organs of sense. It were a perverseness to say that the outward senses, the organization, and the vital properties could arise from the influence of the surrounding elements, or out of matter spontaneously. They are created in accordance with the condition of the globe, and as systematic parts of a great whole."

In accordance with the theory of *final causes*, established by Cuvier, and explaining it, like him, by the law of *organic correlations*, or the *conditions of existence* which have maintained the immutability of species throughout the successive revolutions of the globe, Charles Bell, a religious physiologist, paraphrases an idea previously announced in his preface to the essay on the *Vital Forces of Circulation*, and thus proclaims the pre-existence of a universal plan, realized by creation—the work of a supreme intelligence.

"The law which regulates the movements of

the celestial bodies in the realms of space, and restrains them within their orbits, is not more wonderful than that which suspends a globule of blood in the mass of our fluids, where, owing to which, the same globule submits in turn to the power of attraction and absorption; neither is this law more admirable than that which introduces a molecule into the composition of the body, makes it traverse a circle of revolutions, and transforms it by assimilation alternately into solid parts and liquids, to be expelled again under the influence of the vital forces."*

The Psalmist has said, "Who is like unto the Lord our God who dwelleth on high, who humbleth himself to behold the things that are in heaven, and in the earth?" These verses of the 113th Psalm might serve for a motto to Charles

* "In all the changes the globe has undergone," he says again, "we see a relation established between the animal created and the elements by which it is surrounded. It would be idle to suppose that chance has any hand in this. Where the structure and functions of the animal have been formed to correspond with the conditions of the elements, where the elements have been modified to supply the wants of the animal, and if the most careful investigation leads us to this conclusion when we contemplate all the degrees of animal life, why should we not admit a similar influence in the great work of creation? We cannot resist the multiplied proofs of a commencement, a persistent design, or a first cause," &c.

Bell's chapter which reminds me of them, as they have been selected for the text of the third of the astronomic sermons of his fellow countryman, Chalmers, in which the great orator of the Presbyterian pulpit refutes those sceptics who assert that God would degrade himself if he bestowed a thought on the minor details of creation. "The telescope," says Chalmers, "by surmounting the distance and obscurity which separate us from the higher spheres, has furnished the argument I oppose. But almost at the epoch of its invention, another instrument was contrived which opened to us a spectacle not less wonderful, and rewarded man's curiosity by a discovery upon which I found my refutation. That instrument was the microscope. The first reveals to me a system in every star; the other a world in every atom. The first teaches me that this vast globe which bears the weight of its people and its kingdoms, is but a grain of sand in the regions of immensity. The second, that the smallest grain of sand may enclose within its bosom the tribes and families of an active population. One tells me the insignificance of the world in which I walk; the other raises up that world from its insignificance, by telling me that in the leaves of every fruit, in the flowers of

every garden, in the waters of every brook, there are worlds full of life and as numerous as those which illumine the firmament. The telescope has made me comprehend that beyond and above all that is visible to man, may be found vast fields of creation, extending themselves to infinite distances, and carrying the imprint of the hand of the Most High even to the utmost limits of the universe. The microscope replies to me that not only in the atom to which, by its aid, the eye of man can penetrate, I am able to explore a whole creation of invisible beings, but also that wherever the curtain may be raised from before my senses I might discover as many marvels as are revealed to us by astronomy;—a universe which eludes the power of the microscope itself, but wherein the Supreme Creator finds a sufficient place to exercise his attributes, to combine a new mechanism for new spheres, and to fill them with evidences of his glory."

The *Treatise on the Hand* having appeared at an epoch when Charles Bell had at last conquered his rank amongst his brother professors, and won, even as an author, a certain degree of popularity, we have not been able to mention this work immediately after his papers on the nervous

system, without inverting the dates of our biography.

We now retrace our steps, and find him again in 1822, when having scarcely had time to enjoy the encouragement so long expected, and the testimonies of public attention so long withheld, this genius, at the same time practical and inventive, was compelled to defend its tardily won renown against the attacks of envy and plagiarism.

CHAPTER IV.

A retrospective page—Captain H. Kater—Plagiat—Messrs. Brown-Séquard and Alexander Walker—Disgusts and consolations—Sir Humphrey Davy, Sir F. Chantrey, John Wilson, and fishing—Sir Charles Bell's dog, Sir Astley Cooper's dog, and M. Magendie's dog—The mineralogist Haüy—The physiologist in the fields—The pupils of Sir Charles Bell and his colleagues on the same bench—Animal mechanism—Borelli and Bernouilli—Note on resurrection—Emoluments of a surgeon in London and Paris—The Guelphic order of knighthood—The boy on crutches—Return to Edinburgh—John Bell in Italy—Change of houses—Auld Reekie and the New Town—Letters to Richardson and Fergusson—Lost illusions—Medical teaching in the three kingdoms—Bill for medical reform—Fit of misanthropy—Travels on the Continent—Sir Charles Bell in Paris—Messrs. Roux, Dupuytren, &c.—A breakfast to Sir Astley Cooper—Interview of the Author with Sir Charles Bell—Memoirs of Bourrienne—Nervous habit of Napoleon the First—Pilgrimage of a physiological artist in Italy—The beards of the pioneers and saints—Italian expression—Catholicism and the arts—The statues of Michael Angelo,—Moses,—The Dying Gladiator,—The Laocoon—Raphael and Domenichino—M. Ingres—Roman beauties—Simart and the Venus of the Capitol—Return to Scotland—Sir Isaac Newton and Sir Charles Bell—Last hours of Sir Charles Bell and Charles the Fifth—Moral of Sir Charles Bell's life.

DURING a part of the year 1822, Charles Bell's journal shows him to us still rejoicing in his success, lending himself to be the "lion" of learned

society, and receiving the compliments of some liberal-minded brethren, such as Sir Astley Cooper, Abernethy, &c.

"*January* 31, 1822.—Last week I went to Sir Humphrey Davy's, and there I found my Paper had done me as much good as if I had bought a new blue coat and figured French silk waistcoat. Lynn was with me, and showed his good-nature by the pleasure that the civil things that were said to me gave him. In short, one gentleman—not the least important in that fraternity — Kater, called it the first discovery of the age."*

Scientific France was not the last to pay honour to Charles Bell. M. Magendie himself forwarded his congratulations, and invited him to send the Institute a summary of the same papers read by him to the Royal Society of London. But Sir Charles Bell, sensible to this compliment, preferred responding to it by new labours.

"*June* 10, 1822.—My discoveries have made more impression in France than here, and I have received a second message from Magendie, saying,

* Captain Henry Kater, of the Royal Society, particularly known to the members of our Board of Longitude by his experiments to determine the length of the pendulum. See his papers in the *Philosophical Transactions* for 1818, or consult M. Biot, whose observations agreed with his.

that if I would send him any short account, I should have the prize-medal. This is a ridiculous thing for an old fellow; but I mean it to recoil on them here, and therefore I design not to put them off with a repetition of the old papers, but something better calculated for the meridian of Paris, and to show new facts by a suite of novel experiments. If I was not poor, and had no plagues, how happy I could make myself."

His plagues! If he had resembled his brother John, these plagues would have formed part of his enjoyments; for John, whenever he saw the first symptoms of a debate spring forth, used to congratulate himself.—"This," said he, "is the best mode of making my opinions known. Without some stir and controversy they would never gain ground." But the discussion in Charles's case soon assumed the form of a quarrel. Falsehood became mixed up with it, and he lacked the ardour of John in a personal polemic, the pugnacious temperament which delights in opposition, and finds a new stimulus even in the coarse attacks of its adversary. Charles Bell's idea of the scholar, the professor, and the physician, was drawn from another model. He set much value on his dignity; he wished to be treated with justice, as he had ever dealt justly

by others. His susceptibility was no sickly vanity, but an honourable jealousy of his personal credit. The complaint uttered through his mouth or pen had nothing of bitterness in it. He even tempered his indignation against falsehood. After seeing himself alternately discouraged by indifference, exposed, when successful, to a systematic opposition, and finally attacked on the originality of his ideas, which some ascribed to the ancients, and others confiscated to the advantage of certain modern competitors, whether accomplices or not of this plagiarism, he simply remarked, in the preface to his work on the Nervous System in 1830, as follows:—

"Whatever may be thought of the arguments adopted in this volume, the facts admit of no contradiction; and it may hereafter be a question of curiosity to know how they were received at first. The pleasure I enjoyed in my researches was great; the reception given to them by science has been contrary to what I expected. The first announcement of my work obtained not a single word of encouragement from the faculty; sometime later, when the publication of my papers by the Royal Society rendered it impossible to pass them by without notice, the interest they excited turned

to the advantage of those who contradicted my discoveries, or pretended to have forestalled them. For myself this signifies little, but I confess my regret that the young students who have so favourably and zealously assisted me in these researches should have been deceived in their hope of giving satisfaction to the profession. The pleasure arising from the study of natural science, and the society of true scholars, must, I fear, console them as their only reward."*

He said again, in a note in the *Treatise on the Hand*, "My first experiments on the nervous system date back for twenty-three years. They have been attributed to foreign physiologists. Ignorance of what has been done in England may be excused on the part of a stranger who puts forward such claims, but authors of our own country, who ought to be better informed, are unpardonable for supporting unfounded assertions."†

Up to that period, Charles Bell had preserved a

* This passage is omitted in the third edition. Sir Charles Bell generally revised the prefaces and introductions to each edition of his works.

† With reference to Bell's lectures on the Nervous System, alluded to in the preceding paragraph, M. Brown-Séquard states, that in 1809 Alexander Walker had published, under a purely hypothetical form, the opinion that there existed a difference of functions in the two anterior and posterior roots of the spinal nerves. But

contemptuous silence, leaving some of his favourite pupils and friends to reply to the envious and malicious mass, who perhaps relied a little on his apparent apathy. But if he concealed his annoyance in public, something was necessary to divert his thoughts and enable him to conquer it entirely. This abstraction he found in an amusement which his adversaries also laid hold of to accuse him of neglecting his practical duties. Like Sir Humphrey Davy, Sir Francis Chantrey, and the Professor-poet Wilson, Charles Bell was passionately fond of fishing. Whenever he could escape to the country, he packed his carriage with all the appliances of his sport; and that he might leave no affectionate member of his family to regret his absence, he was always accompanied by his wife and dog, a faithful quadruped who lived, without fear of being sacrificed to an experiment, under the protection of the most learned as well as the gentlest of anatomists.

The canine race approached him without that instinctive suspicion which Sir Astley Cooper laughed

letters of Sir Charles Bell, with a post-mark containing the date of 1807, prove that it was he who had, by two years, preceded the pure hypothesis which Mr. Walker neither attempted to prove by physiological nor by pathological experiments.

at, who, in the ardour of scientific research, never spared his own domestic animals. I remember having remarked, one day when breakfasting with him, that a dog received with respectful fear the morsels of bread offered to him by his master. "The ungrateful brute," said Sir Astley, "owes me a perpetual grudge for having trepanned him, and you see what superb health he enjoys ever since."*

When he once turned his back on London, Charles Bell forgot his hospital and his professor's chair. Having reached the selected spot, under a shady tree, which he called his country-house, he arranged there a sort of vegetable tent, took a book and read, and opened his sketch-book and drew, until the atmosphere indicated the favourable moment for throwing his line. This recreation in the open air invigorated his mental faculties, and his work in London the next day bore evidence of

* Sir Astley Cooper, according to his nephew, who has written his life, had not, however, become *insensible*. "*He wept like a child*" over the misfortunes of Oliver Twist, one of Charles Dickens's early heroes. I feel indebted to M. Flourens for not having forgot Magendie's first friend, the dog he managed to support with an income considerably less than that of Voltaire's *man with the forty crowns*. "During a period which appeared to me rather long," he said, cheerfully, "after all expenses were paid, I had only five sous per day to live upon, and a dog to keep besides. We shared together, but certainly neither of us were fat."

it. "If there are," he says, "any 'best bits' in the *Essay on the Hand*, they were written after a day of complete retirement at Panshanger and Chenies." It is thus that G. Cuvier depicts to us the learned mineralogist Haüy dreaming over his problems of crystallization in the shades of the Royal Garden. Two pages of Charles Bell's journal, nevertheless, prove to us that on examining his conscience, he felt the necessity of justifying himself for this occasional reconciliation with nature, remembering with the poet Cowper that

"God made the country, and man made the town."

"20*th July*, 1824.—I must vindicate my fishing. To long for increase of business is to solicit increase of torture. I must do an operation to-morrow, which makes me to-day quite miserable; and so it is that, looking to an increase of reputation and business, I have not only the conviction that great blockheads have enjoyed all this before me, but that I am providing for a relay and continual supply of suffering. Then again I am confined here to the brick walls and dusty streets; if I make an effort, I cannot with all my diligence get out of the noise of wheels. If some miles from town I accidentally stand still, I feel, what perhaps I have not for months perceived, the absence of

din; and when I feel the fresh breeze, see the clouds high overhead, and the rich verdure round me, I naturally exclaim, 'What have I got in exchange for this?' My philosophy tells me that to study to be happy, we must study to be natural, to take what God has sent us, and has liberally supplied us with appetites to enjoy.

"Yet to enjoy the country, it is not merely necessary to be in it. The citizen goes down with high enjoyment; for a time he is as frisky as a dog let out to snuff and run in the open fields. But after a turn or two he begins by habit to pull out his watch, to wish for dinner, to be weary of looking about him and of having no occupation; and he finds that the change he has attempted is absurd and unnatural to his habits. Is it not something to provide against this humiliating and painful confession of the poor artificial creature—man? Therefore, I say, have some pastime,—and this is mine. How delightful it is to find yourself on a spring day by the side of a stream in a meadow, the fine sloping hills around you, with their dropping trees and broken woods, with your tackle and rod preparing. Look around—you enjoy the solitude, the loneliness of nature—for when once begun, the interest is too intense.—You

wish for rain, for wind, for then the trouts rise freely. But there is a sort of inward sense and consciousness of where you are—that you breathe a pure air, and are fatigued without being exhausted, without lassitude; and you see the day rise, and you see it full noon, and you see it decline, and it is all too short;—hours and days speed away too rapidly for enjoyment.

"Then, if you enjoy a wilder scene—trees, rocks, torrents—how delightful to stand in the very middle of a stream, or near a stream! A cloud passes over the sun, and suddenly the bright waters take a frowning darkness, and then is the time you feel the jerk at your elbow which none but a fisher can speak of: but the varying darkness of the brown rushing waters, the streams, the pools, the rocks, the fantastic trees;—go round the world, you shall not see *these* unless you take a fishing-rod in your hand. Thus you are led to scenes that will even break the eagerness of your pursuit, and make you pause in admiration.

"With all this of nature, there is an additional charm in a very little matter. Man, I am convinced, enjoys the works of his hands; the adjustment of his tackle, the neatness, fitness, and nicety of the whole apparatus, the study of the

flies on the water as well as those in *your book;* the judgment displayed in the adaptation of rod, and line, and fly, to wind, and rain, and fish; and morning, and mid-day, and evening;—these form exactly that gentle exercise of the talents that suits recreation."

Fortunately for Charles Bell, even in London and in the routine of his life as a professor, he found another source of emotion which animated his zeal. This was his class; for teaching with him had ever been a passion rather than a trade. He delighted in surrounding himself with studious youths, and in his familiar intercourse with them realized in the medical art that affectionate appreciation of master and pupil which added such a powerful charm to the philosophic school of Plato. "There is," he says in the same paragraph in which he attributes the best pages of his *Treatise on the Hand* to his rural recreations, "there is another occasion which has never failed to animate me with just views; that is, when my class is gathered about me, and when I enter into the feelings of young men, and am anxious to respond to their enthusiastic desire of knowledge, and to afford them just and consolatory views of nature."

Sometimes Charles Bell, confessing his love of

renown, his ambition of becoming the first man in his profession, in credit as well as in talent, sought to reconcile this desire with a true social instinct. "I communicate more with God than with man," he said in a letter to his brother George. "I have no interest in this world, being without children or fortune. I feel something like pity for those who, like you, are condemned to labour for others who come after them. What signifies, then, my desire for fame? I could give it up, were it not the only link that binds me to society, the sole tie that retains me amongst you. Yes; without this incitement, I could abandon myself to indolent contemplation; I could live on nothing."

Whatever were the claims raised in opposition to Charles Bell as to the priority of his discoveries, the College of Surgeons in London, influenced by the popularity of his class, offered him their senior chair of anatomy and surgery. He accepted it with gratification and hope, both because he looked upon the choice of the College as an honour, and felt the consciousness of his ability to justify it. "I hope," he said, "to draw not only the students but the surgeons back to school again, to show them what we have done since their day." The surgeons came, in fact, and the artists also; Sir

David Wilkie and Sir Francis Chantrey sat by the side of Professor Abernethy and Sir James Macgrigor,—the head of the medical staff of the English army, lately deceased at more than eighty years of age. Nevertheless, in spite of his just confidence, Bell confessed to have felt something very much akin to nervousness, when he saw amongst his auditory, mingled with the young pupils, those to whom he had formerly listened as his teachers, and recognised with others, the venerable head of Cline, the preceptor of Sir Astley Cooper. His series of lectures in the College of Surgeons collected into volumes, under the title of *Animal Mechanics*, formed one of the most popular publications of the Society for the Diffusion of Useful Knowledge (1828-1829).

In the introduction to his *Treatise on the Hand*, Charles Bell considers the Creator as the first of architects and engineers. His essay on *Animal Mechanics* recalls at the same time the posthumous work of Jean Borelli, *De Motu Animalium*, and that of Bernouilli on the motion of the muscles. Sir Charles Bell, with the first of these mathematicians, makes a happy application of the laws of mechanics to the active and passive organs of human motion, calculating the reciprocal action of

the bones of the skeleton—true levers—and of the muscles—true forces—which insert themselves into these organs to make them move with all the different degrees of energy, that is to say, of contraction and extension, required alternately by the action, more or less complex, of walking, jumping, and running. But he avoids the barren theories which bewildered Borelli when he endeavoured to submit to a rigid calculation those phenomena of the animal economy, nutrition, secretion, the action of the heart, of the lungs, of the brain, and of the nerves, in which the vital property sustains a part not amenable to mathematical analysis. Although Bernouilli was something of a physiologist, being originally intended for the medical profession, and although braving the charge of impiety from the theologians, this philosopher ventured to maintain, with respect to nutrition, a doctrine which, in our own days, Cousin was allowed to reduce to a formula, without being accused of attacking the dogma of resurrection, Sir Charles Bell shows himself as skilful in geometry, and much greater as a physiologist than Bernouilli, without diminishing the intervention maintained by the great mathematician above in all the works of creation.*

* Nutrition is that function, or rather that combination of phy-

The emoluments of this chair added little to Sir Charles Bell's fixed income. He still kept, it is true, his clinical practice at the hospital, and his private school in Windmill Street. The death of his brother-in-law, John Shaw, in 1827, made

siologico-chemical functions (digestion, absorption, chylification, oxygenation of blood, &c.), which constitute essentially the assimilation of nutritive molecules for the maintenance, development, and repair of our organs; so that the elements of the body are incessantly changing, while its form alone remains permanent. The brain itself, which M. Flourens (*On Life and Intelligence*) makes the exclusive organ of intelligence, is no exception to this general rule of perpetual alteration. "The molecules of the brain in a man of twenty years of age," says Sir Benjamin Brodie, in his *Psychological Questions*, are not the same as those which formed the brain of the same individual at the age of ten, or will form it when he reaches fifty. Intelligence preserves its identity; but there exists no corresponding identity of the bodily organ with which it is associated; and we may observe that the brain of to-day is not precisely, nor under all its relations, the same as the brain of yesterday or that of to-morrow." At what date of our mortal existence shall we rise again for everlasting life? That is the question. Shall we revive as infants or as old men? Theology does not tell us. Cuvier has said, "Life is a continual whirlwind, the direction of which, all complicated as it is, is, nevertheless, unvarying, like the species of the molecules which are born along with it, but unlike the molecules themselves. On the contrary, the actual matter of the living body will soon cease to be there, and yet it is the depositary of the force which will constrain future matter to follow the same law. Thus, *the form of bodies is more essential to them than their matter, since the latter changes necessarily, while the former remains the same.*" It is, therefore, the *form* of the body that will rise again, without reference to the date. This is my physiological dogma; I know not whether it be orthodox.

a wide gap in his affections, and a little disgusted him with his school, the importance of which, with all others of the same class, declined materially after the establishment of the London University, in which the idea of the founders has not yet been realized with any high degree of success, except in medical instruction. Charles Bell was induced to accept the chair of Physiology in the new university; but the administrative council were not equally happy in their other selections, and with that regard for his dignity which was sometimes mistaken for ill-tempered touchiness, he placed personal feeling above pecuniary interest. On the very day when the classes opened, he tendered his resignation.

This was a sacrifice in his new position, for his income diminished in proportion as his honours increased, and his expenses augmented with his honours. In England, as in France, and everywhere else, surgical practice brings a large fortune to a very small number of operators. Dupuytren had rivals in talent, but none rich enough to offer, as he did, a million to an exiled monarch. Sir Astley Cooper alone, in England, could have imitated this act of professional munificence. Never did surgeon realize receipts equal to his.

The year 1815 brought him twenty-one thousand pounds sterling (525,000 francs). In that year it is true, he had for patients some of the potentates and great foreign functionaries who visited London. Sir Charles Bell never aspired to these exceptional emoluments; he was satisfied with the "golden mediocrity" of the Latin poet. He gave nothing to luxury, while he upheld his rank. Thus he began to grow tired of London soon after being created a knight of the Guelphic Order on the accession of William IV.*

At this time his brother George conceived the idea of inducing him to return to Edinburgh. Charles hesitated long; but, always a man of imagination, he justified what old Professor Lynn was wont to say—the same who had formerly been warned against him as an intriguing Scotchman come expressly to drive him from London:—"My dear friend, you will never change; and if you live to be old, you will still be the boy on crutches."

Who would not sympathize with the illusion of Charles Bell casting a look behind him, called by a tender regret to the scenes where his early years

* He was only gratified with this distinction because it was conferred on him in company with Herschell, Ivory, Leslie, and Brewster. "The batch makes it respectable," he says in his diary.

were passed, at first under the maternal wing, and afterwards under his elder brother, whom he could now forgive for the severe lessons which initiated him into the elements of science! Pencils even less indulgent than that of John Bell had since that time corrected his Venus. His brother George, ever affectionate, spoke incessantly of his young family, and particularly of a nephew to whom he had given his name. Charles Bell had married a faultless woman, but she had not made him a father; and he derived pleasure from the thought of surrounding himself with George's children,—he whom the ancient Lynn had condemned to infancy for his whole life. Edinburgh still held for him associates worthy of his rare endowments, schoolfellows who had nearly all become men of distinction—Jeffrey, his oldest friend, Cockburn, Cranstoun, John Thompson, Forbes, Maconochie, Fullarton, W. Clark, and Adam Ferguson. Finally, the Scottish University, jealous of London, appreciated the fame of the brother and pupil of John Bell, and offered him the inheritance of his chair.*

* John Bell died in 1820, in Italy, whither he had gone, with the kindred spirit of his younger brother, from a love for the fine arts. A volume, entitled *Observations on Italy*, written by John Bell, and edited by his widow, has sometimes been attributed to Charles.

He therefore decided on becoming once more a citizen of his native town.

His impressions at this moment are thus noted in his journal.

"The house is in a bustle. Books gone—pictures packing — people running over the apartments. This *does* look like a change. All my sacred corners—a naked house—no longer a home! Let us, in heaven's name, to the road; for until I build up a corner in Ainslie Place, with my familiar things about me, I shall be like a bird whose nest is in a boy's hat."

"I leave no enemy behind me, and Marion [Lady Bell] is universally beloved. Such kissing and present-making! Why then, as they say, go? Because there is a time, and that time draws near. London is a place to live in, but not to die in. My comfort has ever been to labour for some great purpose, and my great object of study has been attained, and London is no longer what it was, I mean in the condition and respectability of teachers. If I say that the place is filled by inferior men, I do not mean inferior in ability, but of low objects. They do not respect themselves. No!—there is but one place where I can hope to fulfil the object of my scientific labour, and that is Edinburgh;

and that is an experiment. If I find the same grovelling spirit there, why there is an end of all public occupation, and I lay my bones where they should be. I could have made a fortune certainly, and so my friends say; but I could not also attain to what I am, and to what they would have me. Without independent fortune, the relations which we have formed with society are not without their drawbacks. I must be independent, but through exertion more than fortune. I must pursue the course by which I have attained station, and labour to be contented."

It was thus that Charles Bell talked with himself, without seeking to arrange his sentences or to study antithetical points after the manner of a dramatic monologue, but simply to console his mind under the conflict of his lingering doubts. He accomplished his journey, and from the moment of arrival his disenchantment commenced. Thirty years of absence had made little change in his old haunts. If a new city had sprung up by the side of the Edinburgh of his youth, the ancient town, the "*auld reekie*" of Burns and Walter Scott, the Edinburgh of students, which contains the university and the hospitals, preserved its original features. What distressed him was to find

those altered by age whom, in his poetical imagination and affectionate memory, he had contemplated from a distance as always young. Alas! hearts also grow old, and while accusing himself of romance, he perhaps indirectly accused others of having outlived all similar feelings.

But this was not his only disappointment. His opening lecture was attended by a large and brilliant audience, and the expectation of his listeners, with his own, was amply gratified. Charles Bell excited enthusiasm; but in Edinburgh, as elsewhere, the most ardent admiration calms down by degrees. The material results of his new establishment convinced him at the end of the second year that he must considerably abate his hopes. It required all his philosophy to enable him to conceal his vexation.

"I have had a German professor to breakfast, who brings me a volume from Paris. They make me greater than Harvey. I wish to heaven the folks at home would make something of me. I thought in addressing the new-made doctors at the conclusion of the session, that I had done well; but not one word of approbation from any professor, nor has one of them in all this time called me into consultation, except when forced by the

desire of the patient. I take credit that neither a word nor a grin has escaped me in consequence of this, and that we meet cordially. So be it:—we must cling the firmer to old friends, and when they go, lose the desire of holding on to this world."

The preceding paragraph is an extract from a letter of Charles Bell to his friend Richardson, a great fly-fisher like himself, and who had given him his first lessons in the art to which he owed so many hours of delightful abstraction. Amongst the pleasures he looked forward to on his return to Edinburgh, he had included that of throwing his hook in those Scottish streams which, for thirty years Professor John Wilson had made so celebrated by his fishing parties and poetical descriptions.* But Charles Bell confesses to his friend that he does not always recover his sportsmanlike ardour.

"You are kind enough to inquire about my class. To say the truth, I have been unlucky; the number of students regularly attending the university has regularly declined; my class will not bring me 400*l*. I stand well comparatively, but that is poor comfort, since it shows I have no mass

* John Wilson, professor of philosophy, poet, novelist, polygrapher, and for a long time editor of *Blackwood's Magazine*.

to draw upon. See how fast I write to have done with this hateful subject. If you cannot read it, so much the better, for I do not wish to plague your kind heart about the matter. All but honour will be lost.

"I squint sometimes at my rods, but I do not yet let my fingers touch them. God grant that when I do, they may not have lost the power of making a boy of me!"

In a letter of Jeffrey's (14th July, 1839), who passed his parliamentary and judicial vacations at Craigcrook, the Tusculum of the great critic, —then a Lord of Session of the High Court of Scotland and a Member of the House of Commons, —we find that Sir Charles and Lady Bell had decided on building a small cottage on the borders of his estate, attracted by the beauty of the situation, by a magnificent view, and above all by the charms of the neighbouring society.* But this project was never realized.

Already a letter from Charles Bell himself to Dr. Ferguson, shows his serious anxiety respecting the future. Not only was he compelled to renounce all hope of increasing his income, but in addition,

* Letter to Mrs. Rutherford. See *Life and Correspondence of Lord Jeffrey*, vol. ii.

he felt himself and his new colleagues endangered by the Bill on medical reform at that time before the House of Commons.

According to many opinions, Great Britain is behind all the other European states in the organization of medical instruction.* English legislation on schools of medicine and surgery, on hospitals, and corporations of physicians, surgeons, and apothecaries, as also in regard to the individual privileges of the members of these professions, is truly in a state of chaos. Charles Bell, however jealous of the dignity of his art, could not deny this; but neither for the public nor for his private interest did he approve of the measures attributed

* To give an idea of the little unity that exists in the medical legislation of the three kingdoms, the *Edinburgh Review*, for January, 1845, said, that before the establishment of the University of London, there were nineteen different modes of obtaining a licence to practise medicine, nineteen different methods or forms of education to prepare for that profession, and fourteen varieties of privileges attached to it. So that, in this anarchical institution, the highest degree, that of Doctor, was conferred in one place by the universities, in another by the colleges, in a third by a single person, such as the Archbishop of Canterbury, whose favour was worth ten years of study in the various faculties of literature, philosophy, and physic. More recently (April, 1858), the *Westminster Review*, in an article on medical reform, enumerates twenty institutions which, under different titles, possess the right of conferring diplomas in the curative art. The University of London completed the twentieth in competition with the College of Physicians and the College of Surgeons.

to the Government; because the Government itself, not having any settled plan on the question, felt continually obliged to modify under alternating influences. Charles Bell apprehended, above all, both on his own account and on that of other physicians who had won their rank by long study and practice, the pretensions of inexperienced upstarts in science, and of the municipal corporations who wished to regulate the medical art like any other commercial speculation open to a licence.

The difficulty will ever be to combine the securities which society has a right to require from physicians, with the legitimate privileges of a body, which on account of the special nature of medical studies, can only be really estimated by itself! We scarcely know what to say on a problem which still waits a definitive solution in England, as in other countries. Charles Bell published a letter on the subject to the Members for Edinburgh in the House of Commons. In his private correspondence he reminded Dr. Ferguson that he had already been nearly ruined by the competition opposed to his private school in Windmill Street, in which he had invested a capital of 2000*l.*, comprising the fruit of twenty years' labour and the

economical savings of his wife. His chair in the London University had supplied no indemnification, and he went back to Edinburgh in the hope of resuming his scientific researches as a professor in that city. Sir James Graham's Bill appeared to be particularly injurious to the University of the Scottish metropolis—his last asylum—by reducing the emoluments of the professors, which was something, and by lowering their consequence, which, in his eyes, was much more. He was distressed by the reflection that the introducer of the Bill was a Scotchman—a Graham! His rank as a professor had already ceased to be a buckler against those who were seeking to mortify him. He concluded his letter to Ferguson by saying, "As long as something like respect attached to my labours, I was content with loss of income. I put down my carriage with as little feeling as I threw off my shoes. I could further reduce my expenses, but not consistently with a public situation; and I have already encroached on that little provision with which I came here. You perceive with what freedom I speak to you, because I know your feelings as an old friend and pupil. Were it not for Lady Bell I should have no difficulty; no one should hear more of me, or see me, unless they lost

their way in some Highland glen, and sought my cottage."*

We perceive in this ebullition of misanthropy how much Charles Bell's imagination was shadowed by the dissipation of his illusions. He required a more powerful source of abstraction than a visit to the bank of one of the streams where he dreamed of erecting his solitary fisherman's hut. He employed himself with a third edition of his philosophical *Anatomy of Expression*, and resolved to put the finishing hand to it by a journey to Rome.

Charles Bell performed a true artist's pilgrimage, making sketches by the way, and noting down his impressions of the works of art he inspected. Neither did the physiologist neglect his colleagues in the great continental cities where there were either universities or hospitals on a large scale, such as Paris, Lyons, Marseilles, Genoa, and Bologna. In every place he visited he met with a reception worthy of his name and the hospitality he had himself so liberally practised in London and Edinburgh. In these various towns, and particularly in Paris, where every invention and discovery rapidly advances to perfection when French

* The same complaints are repeated in his correspondence with Sir Benjamin Brodie, who endeavoured to tranquillize him.

sagacity has allowed itself to be anticipated by foreigners, he found favourable dispositions towards the author of the *Nervous System*, which deeply gratified him; compliments to his genius which would have revenged him on his countrymen had he required such an atonement; or had he not, as I may venture to say, a little exaggerated the occasional wrongs he sustained in certain instances. When he was desirous of hearing M. Roux, the celebrated son-in-law of the illustrious Boyer, the French professor dismissed his class without a lecture, saying, "Gentlemen, enough for to-day; you have seen Charles Bell!"

This spontaneous eulogium was well calculated to console Charles Bell for the loss of the lecture. A man of refined mind, as well as a skilful surgeon, like his visitor, M. Roux could find no better means of acknowledging the deep and cordial sense he entertained of the hospitality he had formerly received in England from his distinguished fellow-professor. M. Dupuytren was equally fortunate in an opposite style when anxious to sharpen Sir Astley Cooper's appetite for a grand breakfast to which he had invited him.* M. Roux, having been

* Sir Astley Cooper relates the anecdote himself (in the journal published by his nephew) with all his anatomical enthusiasm:—

himself affected by a partial paralysis of the face, supplied Charles Bell with the account of it introduced in the attesting facts of his Papers, with a commentary which the learned patient looked upon as in perfect accordance with his own ideas; for he had been amongst the first to admit Bell's theory, for whom he entertained, as he has often told me, a lively sympathy.

Some years earlier, M. Dupuytren might have shown to his brother associate of Scotland, amongst the patients of his hospital, the young girl who, from a lesion of the double nerve which maintains motion in the muscles of the face, had completely confirmed Charles Bell's assertion, that the nerve of the seventh pair is a nerve of respiration combining in its functions both voluntary and involuntary acts. This girl, whose widely distended lips, shaken like flags by the expirated air, and whose buoyant gaiety, in strong contrast with her immovable physiognomy, made the wards ring with loud bursts of merriment, ever appeared *to laugh behind a mask*,—so still were the features: a conclusive example, in accordance with that of the

"We went to the Hôtel-Dieu, where I found a hall exclusively arranged for me, with a subject, &c. I dissected for nearly two hours before breakfast."—*Life of Sir Astley Cooper*, vol. ii. p. 408.

man whose left cheek having been gored by a bull, was unable after to laugh except with the right, or of the London mimic whose hemiplegy had become a lucrative grimace.

I only caught a hasty glimpse of Charles Bell as he passed through Paris, and when I met him, he, in a bantering tone, asked me for an explanation on the subject of a historical instance of *tic*, extracted by him from *Bourrienne's Memoirs*, and which appears amongst the pathological cases in support of his system. Here it is:—

"When Buonaparte," says the former secretary of Napoleon, "was walking alone or with a companion, either in a room or garden, he stooped a little, with his hands crossed behind his back. By an involuntary motion he raised his right shoulder, and at the same time moved his mouth from left to right. If it had not been well known that these motions were nothing more than a trick of habit, they might have been mistaken for a nervous affection. Moreover, they indicated intense preoccupation, and a sort of congestion of the mind, when he was maturing great ideas. It was often after these walks that he drew up or dictated to me the most important notes."

"Is it to you," said the illustrious physiologist

to me, with a smile, "that I am indebted for having quoted verbally in my lessons, and afterwards for admitting in my appendix to the *Nervous System*, a page of romance? They tell me you have composed certain apocryphal memoirs, and amongst others, those of M. Bourrienne."

I confessed to him a literary association proclaimed much against my desire in one of those bibliographies which expose to the typographical pillory the anonyms and pseudonyms of literature; however, with regard to the *Memoirs of Bourrienne*, I could also tell him with perfect truth, that I had superintended the two first volumes of that work, but without altering a single document, and even abstaining, for the sake of authenticity, from any correction of style which might have substituted me for the author.*

Sir Charles Bell travelled to Italy by the route of Burgundy to Lyons, and from Lyons to Marseilles. His inquiring mind was in some degree *over excited* by the natural effect infallibly produced during a journey by the sight of strange faces. To

* Less scruple has been observed in the two last volumes, but by consent of M. Bourrienne. I have inserted elsewhere (Notes to the Chronicle of Charles the Fifth) the account of the romance of *Julio*, attributed, not without evidence, to Napoleon, in the memoirs of his secretary, who also permitted me to make use of it.

give an idea of this minute observation, we must repeat his lively remarks on the moustaches of the French military, which conveyed to him a particular *expression* of the muscles of the mouth and of the sides of the nostril. Until then, judging by the calm countenances of the English officers, Sir Charles Bell fancied that this decoration of the upper lip concealed a smile of contempt; but he changed this idea when, in Burgundy, he fell in with a fine specimen of a soldier, whose moustache twirled upwards naturally, like that of a cat; and the same phenomenon, he adds, enlivened the physiognomy of three officers with whom he descended the Rhône from Lyons to Avignon. The beards of our pioneers, which he rather ridicules, prepared him at least to find something picturesque in the beards of the Capuchin friars at Rome; although he says he was convinced by the study of the pictures in the churches and the statue of Moses, that living models have much degenerated on the other side of the Alps since the days of Michael Angelo, Domenichino, and Correggio.

"In the French regiments, they set frightful fellows, with axes over their shoulders, to march in front; on their heads a black bear-skin cap, of the form and dimensions of a drum, and they select

men with beards of the same hue, which grow in a bush, the counterpart of that on their heads. But the face, as seen between the two black masses, is more ludicrous than terrible. . . . . Even in the Franciscan and Capuchin monks, the beard has not always the fine character displayed in the works of the old painters. Their models are gone with their times. Something excessive and ideal may be represented by the beard. Michael Angelo perhaps has followed Scripture in the beard of his Moses, which floats below the girdle; and in the fresco of Jeremiah in the Sistine Chapel. The finest painting of the beard that I have ever seen is by Correggio, in the Scala of the Albergo dei Poveri in Genoa,—a fresco of the Saviour in the arms of the Almighty, where the beard of the Father flows beautifully."

Those who have seen Italy, and have been for some time accustomed to Italian life, will readily believe that the *expressive* character of the national physiognomy, the dramatic vivacity of their gesticulations, and the melodious cadence of the language continually reminded Charles Bell of the leading object of his pilgrimage, even if he had been a man likely to forget it. *Natio comœda est,* may be said of the entire people, by translating the

sentence, *a nation of mimics;* but this imitative character more particularly belongs to certain localities; the Roman is grave, compared to the Neapolitan. Every step in Italy supplies a note for the pen and a sketch for the pencil. Enriched with new materials blended in with the first plan of the book, without altering the original conception, the third edition of *The Anatomy and Philosophy of Expression* doubly charms the reader by this alliance of science and enthusiasm so rarely accorded to the critic. Masterpieces of art which combine the exact imitation of physical nature with a realization of the ideal, acquire a new life for Charles Bell without demanding any unusual effort from his faith. The physiologist encourages the poet by recognising in the marble all the springs of organical structure; as if, from the nudity of the heroes of the amphitheatre and circus of old, by the simple study of the exterior muscles, Greek and Roman sculpture had divined all the recent discoveries in anatomy. Charles Bell does not abandon himself to vain regrets, although despairing of seeing the gods and goddesses of Phidias spring into life again under the chisel of Flaxman or Chantrey. He believes in the existence of a modern *beautiful*, while admitting that the *boxers*

of the present day could not compete in the studio with the champions of the Olympic Games. He quotes the following anecdote as bearing on this point: "When Lord Elgin brought to London the figures of the beautiful frieze from the Parthenon of Athens,* and while they remained in his court-yard in Piccadilly, he proposed a great treat to his friends. He had entertained an ingenious notion that, by exposing the natural figures of some of our modern athletics in contrast with the marbles, the perfection of the antique would be felt, and that we should see that the sculptors of the best time of Greece did not deviate from nature. The noblemen and gentlemen who, he conceived, would take an interest in this display were invited. He had the boxers, the choice men of what is termed "the fancy." They stripped, and sparred before the ancient statues, and for an instant it was a very fine exhibition; but no sooner was the bulky form of Jackson, no longer young, opposed to the fine classic figure of the champion of all England, than a cry arose, and 'the ring' pressed forward, and the ancient art and the works of Phidias were forgotten." "Let not the young sculptor," says Bell, in conclusion, "be too sanguine of support."

* Now in the British Museum.

Milton, from his innate love of the arts, a poet and a musician, preserved a sort of catholic taste in the midst of the democratico-puritanical race with which a republican revolution had surrounded him in his mature age. He had not left Italy without a taint. Sir Charles Bell, like Milton, worships not only ancient Rome, but extends to its modern successor a share of enthusiastic reverence which might have shocked his Presbyterian fellow-citizens of Edinburgh. "We trust, or hope," he says, "that in the breasts of those who fill the family pews in our northern churches, there may be more genuine devotion, but to appearance all is pale and cold. . . . . What a contrast is offered to the eye of the painter by the figures seen in the churches of the Roman Catholic countries of the south, as compared with those of our own! There are seen men in the remote aisles or chapels, cast down in prayer, and abandoned to their feelings with that unrestrained expression which belongs to the Italian from his infancy; and even the beggars who creep about the porches of the churches are like nothing we see nearer home. In them we recognise the figures familiar to us in the paintings of the great masters." Sir Charles Bell finds something superbly imposing in the ceremonies of

the Romish Church, the costumes of the dignified clergy, and the processions of the monks. He even believes that the equality which reigns in Catholic temples is more in conformity with the spirit of the gospel than the aristocratic classification of the English churches. But however interesting may be these traveller's impressions in a man of imagination such as Charles Bell, the last edition of his favourite work is eminently valuable for his observations on the great *chefs d'œuvre* which until then he had only known from drawings and scholastic models. What he says of Italian art perhaps at times savours a little too much of the Scotch professor of anatomy, when he places on a level with the sculptors of pagan Athens and Rome the modern artist who approaches them the nearest, but of whom it may be said, nevertheless, that he voluntarily exaggerates the expression of the muscles. Michael Angelo, too, was a great anatomist. Charles Bell, after having admired the statue of Lorenzo di Médicis, in the Capella dei Principi at Florence, and also that of Juliano, brother of Leo the Tenth, with the famous figures of Day and Night, says of the two latter—

"In these statues Michael Angelo has exhibited great feeling of art, and genius of the highest

order; anatomical science, ideal beauty, or rather grandeur, combined. It is often said that he studied the Belvedere Torso, and that he kept it continually in his eye. That fine specimen of ancient art may have been the authority for his grand development of the human muscles; but it did not convey to him the effect which he produced by the throwing out of those magnificent and giant limbs. Here we see the vigour of this sculptor's stroke and the firmness of his touch, as well as his sublime conception of the human figure. We can imagine that he wrought by no measure or mechanical contrivance; that he hewed out the marble as another would cast together his mass of clay in a first sketch. Many of his finest works are left unfinished. It appears that he found the block in some instances too small, and left the design incomplete. For my own part I feel that the finish and smoothness of the marble is hardly consistent with the vigour of Michael Angelo's conceptions; and I should regret to think that such a genius should have wasted an hour in giving softness or polish to the surface.

"Who is there, ancient or modern, that would thus voluntarily encounter all the difficulties of the art, and throw the human body into this posi-

tion, or who could throw the shoulder into this violent distortion, and yet preserve the relations of the parts of bone and muscle with such scientific exactness? We have in this great master a proof of the manner in which genius submits to labour in order to attain perfection. He must have undergone the severe toil of the anatomist to acquire such a power of design, which it was hardly to be supposed could be sufficiently appreciated then or now.

"Without denying the beauty or correctness of the true Grecian productions of the chisel, they ought not to be contrasted with the works of Michael Angelo to his disadvantage. He had a noble conception of the august form of man; to my thinking, superior to anything exhibited in ancient sculpture. Visconti imputes inferiority to Buonarotti; and to confirm his views, compares the antique statues restored by him with the limbs and heads which he added. But I can conceive nothing less suited to the genius of the artist than this task of modelling and adjusting a limb in a different position from that which is entire, and yet so as to preserve the proportions and character of the whole. The manner of his working and the urgency of his genius for an unrestrained field of

exertion, unfitted him for that kind of labour, while it is a matter of necessity that a copy shall be inferior to an original.

"What the figures of Night and Morning had to do before the degenerate son of the Medici, is another matter. They seem to have been placed there as mere ornaments, and in the luxury of talent to give the form and posture of the human figure; '*per ornamento e per solo spoggio di giacitura e de' forme.*'"

It is from Florence that Charles Bell dates the chapter in which he eulogizes the sculptures of Michael Angelo, and winds up with this paragraph on the Moses.

"When in Rome I was impatient until I stood before the statue of Moses, so much had been said of its extraordinary merit, as also so much of its defects.

> Questo e Mosè, quando scenda del monte,
> E gran parte del Nume avea nel volto.

It is a noble figure, with all the energy of Buonarotti displayed in it. It is not the anatomy alone which constitutes its perfection, but there is the same mind displayed in the attitude, the habiliments, the beard, and all the accompaniments, as in the vigour of the naked shoulders and arms. It

is the realization of his high conception of the human figure. My brother, in his *Observations on Italy* finds fault with the arm, and, perhaps, looking in one direction it may be imperfect; but this was one of many figures which were intended by the artist to ornament the great monument to Julius II., and consequently designed to be seen only in a certain aspect. Besides, we ought rather to teach ourselves to admire what is esteemed excellent, than to seek for defects. As to other criticisms on this statue, it should be remembered that it is an ideal figure, as much as the Apollo or the Jupiter. From whatever notion derived, Moses is represented with horns rising from his temples; an adjunct which, placed either on the face of the antique, or of common nature, would have been truly ridiculous."*

Before I had read the criticism on the *giant* Moses by John Bell, I confess that it required this apology. Whichever of the two brothers may be in the right on this point, I have no hesitation in expressing my perfect accord with the following estimate of the *Dying Gladiator*, which I quote

* John Bell severely criticises the Moses, which he considers too colossal, and he even finds fault with the exaggeration of the beard.—*Observations on Italy*, 4to. Edinburgh, 1825.

for the consideration of all who remember the three beautiful stanzas of *Childe Harold.*

"The *Dying Gladiator* is one of those masterpieces of antiquity which exhibits a knowledge of anatomy and of man's nature. He is not resting; he is not falling; but in the position of one wounded in the chest, and seeking relief in that anxious and oppressed breathing which attends a mortal wound with loss of blood. He seeks support to his arms, not to rest them, or to sustain the body, but to fix them, that their action may be transferred to the chest, and thus assist the labouring respiration. The nature of his sufferings leads to this attitude. In a man expiring from loss of blood, as the vital stream flows, the heart and lungs have the same painful feeling of want which is produced by obstruction to the breathing. As the blood is draining from him, he pants, and looks wild, and the chest heaves convulsively. And so the ancient artist has placed this statue in the posture of one who suffers the extremity of difficult respiration. The fixed condition of the shoulders, as he sustains his sinking body, shows that the powerful muscles, common to the ribs and arms, have their action concentrated to the struggling chest. In the same way does a man afflicted with asthma rest his hands

or his elbows upon a table, stooping forwards that the shoulders may become fixed points; the muscles of the arm and shoulder then act as muscles of respiration, and aid in the motion of the chest during the heaving and anxiety which belong to the disease."

"Nothing is true but the beautiful." It would, perhaps, be found that Sir Charles Bell pre-eminently admires in the *Gladiator*, *pathological truth*, which Boileau assuredly never thought of when he said of *truth* that it is *beautiful* and *amiable*. It is thus, also, that appealing to truth in natural history, he compels us to abate something of our traditional admiration for the *Laocoon*, because the reptile which envelops and crushes a victim within its terrible rings, never dreams of tearing the heart, like the allegorical serpent of Remorse.

This criticism, unfortunately, hits Virgil also, whom we hasten to defend by replying for him that the offended deity sends out against his priest a mythological Python, a fabulous monster, equally unknown to Lacépède or Aristotle. For it is certain that a genuine serpent could never have been endowed with a superabundance of venom (*perfusus veneno*) sufficient to stain the fillets

and garlands of the victim; neither would it have torn him with such voracious cruelty (*depascitur morsu*), while compressed within its multiplied folds; and, finally, Laocoon himself would have been unable to utter horrible shrieks (*clamores horrendos*) in the fearful embrace which strangles and suffocates him. The divine Virgil literally embodied a popular tradition.*

I cannot resist the temptation of a last extract from the *Anatomy and Philosophy of Expression*, which recals another reminiscence of Italy—a delightful walk to Grotto-Ferrata with my friend Paul Balze. The passage occurs in the chapter on physical pain, in which Charles Bell compares the demoniac of the *Transfiguration* with that of the fresco of Saint Nilus.

"Two of the greatest painters, Raphael and Domenichino, have painted demoniacal boys. In the convent of the Grotto-Ferrata in the neighbourhood of Rome,† Domenichino has represented Saint Nilus in the act of relieving a lad possessed.

* Michael Angelo, in an analogous subject, has not forgotten to depict the torpor which seizes all those who are stung by venomous reptiles.

† Domenichino, in consequence of some peccadillo, took shelter in the sanctuary of the monks of the Grotto-Ferrata, who made him paint his beautiful frescoes on their walls, under the threat of delivering him up to the Inquisition.

The saint, an old man, is on his knees in prayer; the lad is raised and held up by another aged figure; the mother with a child is waiting the consummation of the miracle. Convulsions have seized the lad; he is rigidly bent back; the lower limbs spasmodically extended, so that his toes only rest on the ground; the eyes are distorted, and the pupils turned up under the eyelids. This would be the position of *Opisthonos*, were not the hands spread abroad, the palms and fingers open, and the jaw fallen. Had the representation been perfectly true to nature, the jaws would have been clenched, and the teeth grinding. But then the miracle could not have been represented; for one, under the direction of the saint, has the finger of his left hand in the boy's mouth, and the other holds a vessel of oil with which the tongue is to be touched. The drawing and colouring exhibited in the lad, and the grandeur of the old man, make this one of the most admirable paintings in Italy."

In his volume, Charles Bell inserts at this place a sketch of a case of true traumatic *Opisthonos*, a pathological instance which came under his own observation in a soldier wounded at Corunna, and in which we see all the muscles of

the body contracted, the extensors yielding to the more powerful action of the flexors; but he admits that the painter who should too faithfully represent the characteristic traits of this horrible tetanus (formerly attributed to demoniac possession), would run the risk of exciting an intolerable feeling of pain.

I do not hesitate to declare with Charles Bell that Raphael must yield the palm to Domenichino. "It may be considered bold to criticise the works of Raphael; but I venture to say that, if that great master intended, in his cartoon of the Death of Ananias, to excite horror, the effect would have been more powerful if there had been greater truth in the convulsions of the chief figure, instead of a mere twisting of the body. . . . . In the same painter's great picture of the *Transfiguration*, in the Vatican, there is a lad possessed, and in convulsions. I hope I am not insensible to the beauties of that picture, nor presumptuous in saying that the figure is not natural. A physician would conclude that this youth was feigning. He is, I presume, convulsed; he is stiffened with contractions, and his eyes turned in their sockets. But no child was ever so affected. In real convulsions, the extensor muscles yield to

the more powerful contractions of the flexor muscles; whereas, in the picture, the lad extends his arms, and the fingers of the left hand are stretched unnaturally backwards. Nor do the lower extremities correspond with truth; he stands firm; the eyes are not natural; they should have been turned more inwards, as looking into the head, and partially buried under the forehead. The mouth, too, is open, which is quite at variance with the general condition, and without the apology which Domenichino had. The muscles of the arms are exaggerated to a degree which Michael Angelo never attempted; and still it is the extensors and supinators, and not the flexors which are thus prominent."

This, it will be said, is again the criticism of a surgeon, but unluckily it is just. It could not have been omitted in a work originally intended to demonstrate to artists the advantage of anatomical knowledge. Charles Bell, nevertheless, returned from Italy with all his enthusiasm for the works of Raphael and Domenichino, as also for those of Michael Angelo, but with a perfect conviction that the modern artists, compared with the ancients, are their inferiors in anatomical truth. Amongst the treasures of sculpture collected by Cardinal

Albani in the villa that bears his name, is a statue supposed to be that of Æsop, which Charles Bell subjects to the same analysis with the Apollo; a keen criticism which enables him to demonstrate that the hunchbacks of Athens had also their Phidias.

I had the happiness to reside six months at Rome, under the same roof with my illustrious friend M. Ingres, and the following paragraph by Charles Bell recals to me some of our conversations in the Villa Medici: "If a painter entertains the idea that there is some undefined beauty, distinct from nature, which is in his own mind, his works will want that variety which is in nature, and we shall see in his paintings the same countenance continually reproduced. We are informed that Raphael, in painting the head of Galatea, found no beauty deserving to be his model; he is reported to have said, that there is nothing so rare as perfect beauty in woman; and that he substituted for nature a certain idea inspired by his own fancy. This is a mistake: painters have nothing in their heads but what has been put there. There is no power in us to disengage ourselves from material things, and to rise into a sphere of intellectual ideas; and least of all in what regards man. In the Farnesina, there

are frescoes by Raphael and his scholars, demonstrating to me the nature of those studies which at length enabled him to compose, not to copy, the beautiful Galatea; that he first drew from what he saw, and finally avoided imperfections, and combined excellencies." Charles Bell adds that what he most admired at the Farnesina was the beauty and variety of the female heads, and the manner in which Raphael has bound up the hair and let it flow about the neck and shoulders. "Where," says he, "did he find all this? Perhaps in the streets of Rome." Although myself born in a city which has certainly admirable types of female beauty, I remember also being much struck by more than one specimen I encountered in Rome. Once, at least, I followed the Galatea of Raphael, detached from his canvas; and at another time, when I was sitting with M. Ingres, Simart rushed in, in an excited state, exclaiming, "I have just discovered the Venus of the Capitol; come and see her, for I have taken her address."

Burke was the first who said what Madame de Staël has often repeated: *Foreigners are a contemporaneous posterity.* If there were in France, to entertain Charles Bell, the surgeon, physiologist, and artist,—surgeons and physiologists, such

as MM. Flourens, Roux, Marjolin, Magendie, &c., there were also contemporaries equally worthy of comprehending him in the country of Galvani, Spallanzani, Volta, Redi, and Scarpa;—if we name only Professor Matteucci of Pisa. In more than one respect his journey to Italy was well calculated to reconcile him with science and scientific men, by proving to him that his claims were respected at a distance. It was also a proud and gratifying satisfaction to him to bring back those sketches and notes which added fresh authority to the first work of his youth. Nevertheless, it seems that he returned to Edinburgh with all his habitual melancholy, and little disposed to retract these words inscribed in one of his daily monologues, on returning from a fishing party: "Whoever has sat on a sunny stone in the midst of a stream, and played with the osier-twigs and running waters, must, if he have a soul, remember the day, should he live a hundred years; and to return to such a spot, after twenty years of a struggling life in the great world of man's invention—to come back thus to Nature in her simple guise—again to look up to the same dark hill—again to the same trees, still in their youth and freshness—the same clear running waters;—if he can do this,

and think himself better than a cork floating on the stream, he has more conceit than I."

The great Newton, a short time before his death, uttered this memorable sentiment: "I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."*

This reflection of Newton, like that of Charles Bell, belongs, it is true, to the philosophic and Christian sage; but, alas for poor philosophy and human wisdom! it may equally apply to the invalid. For some time Charles Bell had suffered from the first symptoms of a disease of the heart (*angina*). He undertook a journey to London at the close of his first session in 1842, and arrived on the 27th of April at the seat of Mr. Holland, near Worcester. The scenery on the banks of the Severn delighted

* I quote the passage as M. Biot has translated it in the article NEWTON of the *Biographie Universelle*. Sir David Brewster, who also gives it in his new *Life of Newton*, adds, "What a lesson to the vanity and presumption of philosophy—to those especially who have never even found the smoother pebble or the prettier shell! What a preparation for the latest inquiries and the last views of the decaying spirit—for those inspired doctrines which alone can throw a light over the dark ocean of undiscovered truth!"

him. He sketched the church of Hallow Park, with the churchyard and its surrounding yew trees, and said to his wife, "This is a sweet spot; here I should like to rest till they come to fetch me away." Were these words the expression of a vague presentiment? The evening was spent with the family of his host in cheerfulness;—an occasional paleness spread over his face, which one anxious eye alone perceived. He descanted on that masterpiece of art, "The Last Supper," by Leonardo da Vinci, an engraving of which lay before him, and repeated the passage from the Gospel. After retiring, selections from the Scriptures and the Prayer Book were read to him, as was his wont, and he chose the 23rd Psalm, the Thanksgiving, and the Evening Collect which prays for "that grace which the world cannot give."* After a few hours' sleep, he woke with a frightful spasm, asked his faithful companion to raise him in her arms, and immediately expired.

Charles Bell was regretted, not only by his family, but by his friends, for he had many, and was formed to have them; sufficiently great to

* Does not this remind us of that last scene in the life of Charles V., where the august recluse of Yuste contemplates a picture by Titian?—See my *Chronicle of Charles V.*, Part 2.

render his rivals jealous, and too good for them not, sooner or later, to pardon his superiority. If he was not perfect, his faults were consistent with his noble ambition. He loved all that was beautiful like a man of imagination; and like a true practical philanthropist he strove to render it useful. Anatomy, in his eyes, was something more than the pedantic nomenclature of the different parts of a dead body. In March, 1818, he inserted in his journal—"I have solicited an interview with Rennie, the engineer, to discourse with him on the uses of anatomy, and to show him how the All-powerful Creator made arches, bridges, cables, and all that engineers undertake." In the study of death Charles Bell discovered the science of physical life; but brought up by a religious mother, elevating the art and science of the great Architect of the Universe above the art and science of men, he might have exclaimed with Galen, pausing in the midst of an autopsy, "It is not a lecture on anatomy I am delivering; it is a hymn in honour of the Creator."

At the commencement of these pages we alluded to the small volume in which Sir David Brewster has related in succession the lives of Galileo, Kepler, and Tycho Brahé, under the title

of *History of the Martyrs of Science.* Charles Bell, we say, might be included in this martyrology; but to preserve the philosophic moral of his biography, we shall repeat also that, in reality, he was only the victim of his imagination: he had to struggle, no doubt, but such is the condition of all science and all virtue;—a condition from which Sir Isaac Newton himself was not exempt.*

"Pain," remarks Sir Charles Bell, in his *Anatomy and Philosophy of Expression*, "is affirmed to be an unmitigated evil; yet pain is necessary to our existence. At birth it rouses the dormant faculties, and gives us consciousness. To imagine the absence of pain, is not only to imagine a new state of being, but a change in the earth and all upon it. As inhabitants of earth, and as a consequence of the great law of gravitation, the human body must have weight. It must have bones, as columns of support, and levers for the action of the muscles; and this mechanical structure implies a complication and delicacy of texture beyond our conception. For that fine texture a sensibility to pain is destined to be the protection; it is the safe-

* See, in the article of the *Biographie Universelle*, by M. Biot, and in the work before quoted, by Sir David Brewster, the accusations of Leibnitz against Newton, and his quarrels with Hooke, Flamsteed, &c. See, also, the *Appendix*.

guard of the body: it makes us alive to those injuries which would otherwise destroy us, and arms us to avoid them." What Charles Bell said of the physical organs, may we not equally apply to moral sensibility? Difficulties, vexations, and injustice are necessary to sustain the watchfulness and activity of the soul.

If Charles Bell was nothing more than a simple knight of the Guelphic order, if he merited more distinguished honours than those conferred upon him, was he not to blame for sometimes forgetting, to the injury of his own happiness, that there is no apotheosis for the sage, nor canonization for the saint, on this side of the tomb?

APPENDIX AND NOTES.

APPENDIX.

THE frame within which I have circumscribed my subject forbidding those digressions which many readers find attractive, I purpose combining, under the title of *Appendix*, a few supplementary notes, and also one or two fragments of forgotten or unpublished works, alluded to more or less directly in the text.

The history of the discovery of the functions of the nervous system, as of that of the circulation of the blood, proves, unfortunately, that there is much caprice in the admiration for new talents and theories; or, in other words, for everything that unites originality with truth, which seems to be sometimes assigned as an exclusive feature in English character and patriotism. I cannot admit with M. Biot that "the lives of scientific men are usually uninstructive," under the pretext that "the events by which they are marked seldom aid in the pro-

pagation of their discoveries, or lead to new ones." It is, no doubt, a just observation that "every discoverer has a different construction of mind, and in virtue of his inventive faculty borrows nothing from any one else;" but I must oppose to M. Biot the words of Laplace: "A knowledge of the method adopted by the man of genius is quite as beneficial to the progress of science, and even to his own fame, as are his discoveries." M. Biot and a young critic who relies on his great authority, are, moreover, self-refuted by what they have told us while quoting from the *Life of Newton*, by Sir David Brewster.* The great name of Newton has appeared more than once in my little work on Sir Charles Bell. Notwithstanding some coincidences, I never dreamed for a moment of instituting a comparison between two men who had neither the same character nor the same imagination. As to character, my sympathies are with the physiologist; as to imagination, I pity the physician who, having, it is said, composed verses in his youth, conceived in more mature age a vast contempt for poets and poetry, while the physiologist,

* I allude to a young scholar who already adds credit to the name of a distinguished father. M. Paul de Remusat says, on the reception given to the first essays of Newton: "This cordiality towards new talents and theories belongs to the English character. Every one in London makes it a point of patriotic vanity to admire his countrymen." See a volume entitled *The Natural Sciences*, where, amongst other articles, the author has reprinted a very remarkable one on *Experimental Physiology*, in which he analyzes with great impartiality the dispute between Messrs. Cl. Bernard and Figuier, on the glycogenetic function o the liver.

to his last hour, continued faithful to his early predilections for art and literature. Charles Bell would never, like the sublime author of the *Principia*, have called the Greek statues *marble dolls*.

It would, however, be unjust to accuse Newton of having forgotten that all the muses are sisters, and formed to live in the most harmonious intercourse. It seems as if even he, in his old age, sought to divert his attention from scientific pursuits, and the opposition they gave rise to, by losing himself in the realms of imagination. The Apocalypse presented itself to him as a sacred but obscure poem, calling for an interpreter. I prefer adopting this view of his observations on the mystical visions of St. John, to considering them as arguments in support of those who are anxious to prove that the greatest genius of England sometimes suffered under a mental eclipse.

DEDICATION, p. iii.

Although the name under the auspices of which I place my little book scarcely requires a note, it gives me much pleasure to reprint an article formerly inserted by me in the *Biographie Universelle:*

"Joseph Fages, Professor in the school of Montpellier, was born at Toulouse, on the 1st of August, 1764, and died on the 4th of June, 1824. This eminent surgeon, in common with all men of genius, had a natural instinct for his art. Being placed at the age of fourteen

in the Hospital of Saint Joseph-de-la-Grâce, he soon became distinguished by his love of study and surprising progress. Before he completed his eighteenth year, he had already delivered a course of lectures on anatomy, surgery, and midwifery. In 1783, he competed for the first time for the post of chief internal surgeon in the hospital of Montpellier. His superiority in this contest was indisputable, but custom secured the first place to the surgeon who occupied the second, and it was not until 1785, that Joseph Fages obtained in a new competition the rank he had already long deserved. About this time his labours were acknowledged by the Royal Academy of Surgery, which decreed to him its silver medal; but they won for him more especially the paternal friendship of Louis, who frequently expressed an anxious desire to place him near his own person. In the year III., Joseph Fages was appointed surgeon-in-chief to the army of the Eastern Pyrenees, and subsequently head surgeon to the military hospital at Montpellier. There, in the absence of the suppressed schools, he established a class, in which several of our military surgeons received their first training. This temporary suspension of the schools had at least the advantage of leaving the professor at liberty to disencumber himself of certain fetters imposed by routine on the system of teaching under the old Faculties; and we owe to J. Fages the foundation of a course of clinical surgery, which, until then, was unknown in the Ludoviceum of Montpellier. Private animosities, however, excluded him from the list of professors on the re-organization of

the school; and it was only after two brilliant contests, in one of which he had Delpech for competitor, that, in 1814, he was appointed to the chair of operative medicine. His lectures, delivered with unvarying regularity, produced regret that this act of justice had been so tardy. A stranger to the intrigues of the school, Professor Fages gave himself up entirely to his pupils, and his zeal, in all probability, hastened his end. His lectures are rich in erudition without pedantry and in his style of eloquence he combined a happy mixture of familiar turns, picturesque and energetic expressions, kindness and delicacy, which contributed as much as his profound instruction to assemble daily round his chair a numerous and attentive audience. He was undoubtedly the most popular professor in the establishment. Joseph Fages, born without fortune, had in some measure made himself.* He had admirers and friends, but no patrons. He left to his son, Professor-substitute at Montpellier, the noble inheritance of his example, his name, and his library."—(*Biographie Universelle Classique, &c.*)

* Sir Charles Bell characterized very happily the independent genius of Bichat when he said that he followed, in his teaching, the revolutionary movement of the age. As a general position, whatever obligations genius may owe to masters and traditions, it is still more indebted to the inspiration of its own unfettered thought. For this reason Sir Humphrey Davy congratulated himself on having had a master who neglected him. "I have made myself what I am," he said; "I say it without vanity, and in pure simplicity of heart." Professor Fages might have used the same words.

PREFACE, pp. v. to xiii.

In my preface I allude to an unfinished work in which I drew a comparison between French and English medicine, by mixing up in the analysis, doctrines, portraits, and sketches, of which the following fragment would have formed a part. This is a page from my personal reminiscences.

BIOGRAPHICAL SKETCHES—MEDICAL PHYSIOGNOMIES.*

Mira, que medico he sido,
. . . . . non esta olvidada
La ciencia.
CALDERON DE LA BARCA, *El Medico de su honra.*

"*Honora medicum,*" says the Preacher. I am personally too much interested in the precept to forget it. Far be it from me to betray the mysteries of the art, or to satirize those who profess it. I admit, however, that it would be injurious to satirical and comic literature if all physicians, who are authors, had the same scruples. Yorick said of our society, so proud of its levelling civilization, that it bore some resemblance to a bag of old coins worn out by friction. The comparison

* This fragment was printed in 1834, as preface to an anatomical tale, of which the celebrated Vesalius was the hero.

is more just in the present day, when we have lost even the *super cutaneous* envelope of the costume, which, in the time of Yorick, preserved some distinction, at least between classes and conditions. Well! if there is a profession, the original features of which are still distinctly marked, it is that of the physician. There is not one that exhibits more honourable characters, more disinterested devotion, more logical or higher minds; but, at the same time, there is none that presents a greater number of *exceptional individualities*, as we now say, or more *humorists*, as the English express it. It is true that to comprehend the eccentricities or virtues of an initiated class, we ought to be amongst the initiated ourselves. I never knew any one who could caricature a physician to the life, but a brother of the craft. Not that I wish to insinuate that being a doctor would suffice to compound such a book as *Memoirs of a Physician*,—a happy frame; half filled, however, with other characters than patients, to make a companion to *Gil Blas*, that admirable picture of human life, in which I can find nothing to regret, but that the hero, after all, is little better than a rogue.

Ye who believe that we cannot discover anything to laugh at in the children of Hippocrates, after Molière,—read, in the great *Dictionary of the Medical Sciences*, the article PHYSICIAN; you will there find fresh varieties of genus and species:—the pedantic and the foppish physician, the rough and the polite doctor. You will see traditional heirs even to the classic *Purgons*. The author finds matter for an entire monograph on a

hybrid or bastard genus, *quacks*, which he arranges in a classification adopted from that of insects.*

For myself, if I thought I possessed the talent of painting,—instead of thus tracing fanciful portraits, an exercise of descriptive power more sentimental than critical,—I should prefer sketching, for my own advantage rather than that of my readers, a few of the high celebrities or original physiognomies of the medical world, whom I have had the fortune to encounter in the journey of life; and whose antique-looking heads my impressionable imagination often opposes to the less characteristically defined faces of our present schools and academies.†

Like the rest of my contemporaries who have exhausted *nearly* half the number of years assigned by the Psalmist for man's life, I have come in contact with

* This is a half comical and half learned classification, after the manner of that of M. Charles Fourier, the phalansterian, in his *Theory of Analogues:* "Like insects, quacks multiply with an abundance truly prodigious; they frequently change their exterior, and clothe themselves anew in a thousand different forms. Some seem to have wings like butterflies; these are the titled quacks who thrust themselves into the highest dignities. Others crawl like the *cimex*, and are betrayed by their vulgar and hateful manners, as the *cimex* is recognised by the infectious odour it emits. The latter class drag on an obscure existence, and with the *acari* are almost imperceptible: the former shine in broad daylight, frequent drawing-rooms, and attract notice by the noise they make and occasion, as do the large *scarabœi* by their size and singular form. Finally, such quackery protects itself by impudence, as do the coleopteræ with the horny shells that encase them."

† MM. Scribe and Mazères have delineated a delightful portrait of a physician in their *Charlatanisme*. Dr. Rémy is M. Blache.

some of these old priests of Æsculapius, living relics of an exploded system of medicine, personified traditions of I know not how many empirical dogmas, in the faith of which our fathers lived and died. Alas! when we ponder over the history of those infallible cures which at least have immortalized their discoverers, does it not seem as if the Evangelist spoke of our multiplied theses when he said, *Tradidit mundum disputationibus eorum?*

The first figure of a physician which impressed itself on my mind, and which I still find distinctly engraved there with my early reminiscences, was that of the celebrated Dr. Pomme, the curer of hysterics, who was more than eighty at the commencement of the present century. His high tide of popularity dated back to the reign of Louis XV., when vapours, which we now call neuralgia, or neurosis, was the favourite malady of the ladies of the court and fashionable world. Tronchin alone excelled Dr. Pomme in reputation. It is literally true that he was called in from Arles to Paris, a distance of nearly two hundred leagues, and more than once, to attend the Duchess de Chevreuse, or some other dame of equal rank, and that every visit cost the patient ten thousand francs (400*l.*). Dr. Pomme assigned all ailments to the same cause, for which he had one simple remedy,—a ptisan of lamb's neck. Nevertheless he found matter enough for a huge volume on *Hysterics.** The

* *Treatise on Hysterics.* I believe the first edition was in 1760. I have only the second, printed at Lyons by Benoit Dupleix, M. DCC. LXV., with the approbation and privilege of the king.

revolution which so abruptly cured the nervous affections of the fine ladies, considerably diminished Dr. Pomme's practice, and, if I am not mistaken, led to his being denounced as the physician to aristocratic complaints. He was forced to hide for a time; but after the 9th of Thermidor, he re-appeared with his full-powdered periwig, his ivory-headed cane, and his ptisan of lamb's neck, still loyal to his medical and political opinions, as if ten years of a republic had made no change in the national temperament; and thinking, perhaps, that France might have escaped her revolutionary fever, and the horrible butcheries of the reign of terror, if she had placed herself under the regimen of his composing panacea.

My father's house, the legend of which I have related,* adjoined that of Dr. Pomme, a contiguity which won for me, whenever I met him, a gentle tap on my young cheeks, sometimes even a few encouraging words, which made me quite proud; but let me confess, I was more fortunate still in procuring the special favour of his valet, named Pitré, through which I obtained free entrance to his garden outside the town, with two privileges,—the first, that of turning out of their nests all the sparrows which every year took possession of an uninhabited story in the house; and the second, that of clambering up a lotus tree, whose graceful branches surmounted an old wall, and there devouring gratis as much fruit as I could swallow, while all the other boys

* *Le Trésor du Plan de la Cour*, an episode in *Le Dernier Roi d'Arles*.

paid a sou each to the gardener for the same advantage. These little incidents have no doubt contributed to preserve in my recollection the imposing aspect of Dr. Pomme, whom I still fancy I hear scolding his maid-servant as he descended the stairs, or handing a patient to his door with a final recommendation of the ptisan of lamb's neck. This figure had so completely possessed my youthful imagination, that for a long time it greatly injured every medical celebrity that presented itself before me with less solemn and antiquated attributes. For instance, I had less faith in a very clever and learned doctor of Saint Rémy, who also condescended to tap me familiarly on the cheek at the same period, and who, gifted with the most communicative gaiety, is sure to make his patients laugh, though he may sometimes fail to cure them.*

In the year 1815, when, leaving college, I arrived at Montpellier, to assume rank myself amongst the disciples of Hippocrates, I will not deny that a few intermediate samples had altered a little the first type of a physician presented to my youthful mind in the

* Alas! poor Yorick! M. Mercurin is no more. He was physician to the lunatics of Saint Paul, where he has been well replaced by Dr. Casimir Blain. In the introduction to the *Last King of Arles*, I have named two of the medical and surgical illustrations of Arles—Dr. Vauthier and Dr. Clément, who were both physicians to the court.

Amongst the predecessors of Dr. Pomme, I ought to mention Dr. Du Laurens, who, amongst other works, drew up an *Anatomy* in Latin, containing an *Essay on the Hand*, which Charles Bell assuredly had not seen when he wrote his own.

person of Dr. Pomme; but on the day, when hurrying to become matriculated in the register of students, I passed through the halls decorated with portraits of the old professors and governors of the Ludoviceum, at sight of all those venerable heads, the chain of the past was again renewed in my mind; more than ever I persuaded myself that true medical science required the indispensable crown of a periwig, and the sceptre of an ivory or golden-headed cane. Armed with my introductory receipt, I took my place, full of respectful emotion, on the benches in the hall of the inaugural lectures; and no sooner had a murmur of approbation and customary applause announced the entrance of the professor, than my eyes were fixed upon the chair, expecting to see it filled by an old gentleman resembling the portaits I had devoutly saluted, arrayed in the hood and all the other insignia of professorship. What was my surprise at the appearance of a man in a frock coat, with a rosy complexion, a light-coloured toupee, and an erect carriage, gracefully waving to and fro before his olfactory organs a full-blown rose. All my ideas of the medical type were overthrown. Having ascended his pulpit, this elegant professor glanced round upon his auditors a mingled look of benevolence and authority; then, with a deep-toned and well-modulated voice and the air of a prophet, or rather of a tribune, he commenced an admirable discourse, redundant in images and action, but regulated by refined taste. This was the eminent Professor Baumes. Under his powerful eloquence, the prestige of the old school disappeared,

and during my entire residence at Montpellier I should have found it difficult to personify the type of a professor under any other figure than that of a fair-haired Apollo, with a rose in his hand. I ask pardon of certain powdered dignitaries of Montpellier,* whose heads were more in harmony with the wig of Dr. Pomme and the academical portraits of the school. But by the side of Professor Baumes there were two or three other magnates with hair *à la Titus*—the incisive Fages, the persuasive Lordat, the favourite pupil of Barthez, and Delpech, whose tragical death left Dupuytren without a rival. But I must confess once more, in the name of my fellow-students (untractable and censorious youths), it was not the powdered heads that inspired us with the greatest amount of respect and confidence. I could relate some rich anecdotes of Professor Baumes, but I have already introduced them in another work, and here I purpose giving only an outline of my portraits. Without digressing further, I proceed to a new impression, which five years later revived in my memory the physiognomy of Dr. Pomme.

I came to Paris a fresh doctor, directly interested in contradicting the received proverb, "A young surgeon, an old physician." I had partly forgotten Dr. Pomme and his patriarchal appearance, but a letter of recommendation introduced me to a friend of my family, at whose house, on my first visit, I accidently met Baron Portal, who presented to me a veritable spectre of the

* Amongst others, of the benignant Professor Vigaroux, ever smiling and appealing to the authority of his illustrious father.

old medical system. I say spectre, and the term will scarcely appear metaphorical to any one who remembers that more than octogenarian, that withered corpse, whose osteology was almost apparent, afflicted with an aphony that scarcely left him a breath to communicate with the living; but who, from his advanced age, his name, and titles, commanded universal silence when his lips articulated in words the feeble remnants of a voice.* My quality as a member of the same profession obtained for me, notwithstanding my youth, a presentation to this venerable professor, but he only awarded me a slight indication of the head, for I had interrupted one of those gossiping conversations which the great archiater was partial to, and which he hastened to resume, when, upon reflection, he satisfied himself that I was not altogether one of the profane. Baron Portal spoke of himself and of the age, the costume of which he in part preserved. "It was in 1766," he began; but as I am not quite sure of remembering his exact expressions, I shall merely say that he told the story of his arrival in Paris, and his progress as a physician. Young Portal travelled on foot from Gaillac to the metropolis, richer in hopes than in money. Between

* One of my spiritual associates, Dr. Reveillé-Parise, to whom I read this portrait, related to me an anecdote which corroborates its fidelity. When the cross of the Legion of Honour was conferred on Baron Portal, he perused the letter of the minister announcing to him this new mark of favour, with unfeigned surprise and some symptoms of agitation. "Truly," said a doctor who witnessed his delight, "M. Portal was so excited that if a lingering drop of blood had remained in his veins, he would have had a fit of apoplexy."

Lyons and Roanne, as he marched briskly along, with his small bundle at the end of a stick, he observed another young peripatetic like himself, little encumbered with baggage, who appeared to be travelling in the same direction. The two entered into conversation. Both came from the South, and both were journeying to the capital—one to earn a livelihood as a surgeon, the other to seek his fortune in the church. The young doctor and the young abbé conceived a mutual friendship during this pilgrimage, in which they shared expenses. On reaching Paris, they lodged in the same garret, and dreamed together of their first surgical operation and sermon. One day the *Gazette* informed them that a princess, daughter of Louis XV., was dangerously ill. "Ah!" exclaimed the young doctor, "if I could only be employed to open her after death!" "And I," rejoined the abbé, "to deliver her funeral oration! our fortunes would be made." The princess died. Ferrein, who was the fellow-countryman of Portal, selected him to make, under his superintendence, the autopsy of the august defunct. He acquitted himself with a degree of skill which led him, one year after, to the chair of anatomy in the college of France, and so on to all his other titles and places. A similar recommendation appointed his friend to pronounce the usual mortuary eulogium on the most high and most puissant princess. . . . . I forget the whole formula. A few years after, the panegyrist of the king's daughter delivered before the French Academy a similar laudation of Saint Louis himself. He became grand vicar of

Lombez, succeeded to the chair of Lefranc de Pompignan, was chosen deputy to the States-general, created Bishop of Montefiascone, and Cardinal. This was the Abbé Maury. These two exalted dignitaries of medicine and the church never lost sight of each other from their first point of departure in the career of greatness.

This historical anecdote, very agreeably related, completely reconciled me to the obsolete costume of the professor, to his treble tie-wig, his ivory-headed cane, and his buckled shoes. The date of the opening of his recital increased its solemnity. I subsequently collected in the hospitable drawing-rooms of his daughter, from the conversations of Doctors Dalmat and Bousquet, other curious anecdotes of Doctor Portal.

I may remark, incidentally, that the South has supplied Paris with several medical men of the first class; amongst others, Professor Alibert, a combination of the artist-physician and accomplished scholar. But I must confine myself here to the dead, however agreeable it may be to praise our living friends.*

* * * * * *

The English physicians figure to a considerable number in my album of typical portraits and medical

* I have said that this is only a fragment, which may explain why, in my reminiscences of Montpellier, I have neither named the Professor of Candolle, that type of elegant elocution; nor Professor Virenque and his puns, nor Professor Lafabrie and his smart repartees, nor Professor Berthe, my accomplished countryman, nor Professor Broussonet, who was ever kind to me, nor Professor Prunelle, whose temper was less amiable, &c.

humorists. English *humour* becomes doubly eccentric in the successors of Browne and Sydenham. I could relate several anecdotes of Astley Cooper and Charles Bell, of Baillie and Abernethy, in London; of Hamilton, in Edinburgh; and, finally, of J. Thomson and Monro, the owner of the fine museum of anatomical figures collected by his father, of which he was so jealous that a sight of it could only be obtained by stratagem.

I also met in England the famous Jenner, but instead of conversing with him on vaccination, I found myself continually drawn away by ingenious transitions to laud him for an accomplishment which seemed to flatter him much more than his celebrated discovery. He had probably been told that in France he was looked upon as a country quack, and felt anxious to convince me that he was a gentleman and a poet. It was not exactly the stag thinking more of his horns than his legs, if we may judge by the following verses he presented to me, and in which all the phenomena that precede rain are most poetically expressed:—

SIGNS OF RAIN.

An Excuse for not accepting the Invitation of a Friend to join a Country Excursion.

The hollow winds begin to blow,
The clouds look black, the glass is low;
The soot falls down, the spaniels sleep,
And spiders from their cobwebs creep;
Last night the sun went pale to bed,
The moon in halos hid her head;

The boding shepherd heaves a sigh,
For, see, a rainbow spans the sky.
The walls are damp, the ditches smell,
Clos'd is the pink-eyed pimpernel:
Hark! how the chairs and tables crack!
Old Betty's joints are on the rack;
Loud quack the ducks, the peacocks cry,
The distant hills are looking nigh;
How restless are the snorting swine!
The busy flies disturb the kine;
Low o'er the grass the swallow wings,
The cricket, too, how loud it sings!
Puss, on the hearth, with velvet paws,
Sits, smoothing o'er her whisker'd jaws;
Through the clear stream the fishes rise,
And nimbly catch th' incautious flies;
The sheep were seen at early light,
Cropping the meads with eager bite.
Though June, the air is cold and chill,
The mellow blackbird's voice is still;
The glow-worms, numerous and bright,
Illum'd the dewy dell last night;
At dusk, the squalid toad was seen,
Hopping, and crawling o'er the green;
The frog has lost his yellow vest,
And in a dingy coat is dress'd:
The leech, disturb'd, is newly risen,
Quite to the summit of his prison:
The whirling wind the dust obeys,
And in the rapid eddy plays.
My dog, so alter'd in his taste,
Quits mutton bones on grass to feast;
And see yon rooks! How odd their flight!
They imitate the shifting kite;
Or seem precipitate to fall,
As if they felt the piercing ball.
'Twill surely rain;—I see, with sorrow,
Our jaunt must be put off to-morrow.

Chapter I., p. 8.

"*Abroad, the commercial enterprise of the Scotch founds colonies, discovers islands, or perforates an isthmus to unite two continents,*" *&c.*

In this rapid enumeration, I have omitted many eminent names; but here I particularly wish to mention a distinguished Scotchman, to whom I had dedicated a paragraph in the account of the rivalries between England and Scotland, inserted as an introduction to my *History of Charles Edward.* The person of whom I speak is William Paterson, founder of the Bank of England and colonizer of the Isthmus of Darien. No Scotchman ever excited more than he did the jealous animosity of England; no one was ever more exposed to the darts of satire; so much so that Lord Macaulay himself, yielding to the opinions of the pamphleteers of the day, represents him in his noble history as an adventurer in the science of calculation, a speculator as ingenious as Law, and even less scrupulous:— "His friends said he had been a missionary; his enemies that he was formerly a buccaneer." William Paterson has lately found a countryman to reinstate him by the publication of his works, accompanied with biographical notices. I am as yet only acquainted with these two volumes, recently edited by Mr. Bannister, through a review of them in the *Literary Gazette* of the 4th of September, 1858.

Chapter I., p. 29.

"*The friends of Charles Bell*," &c.

In naming the friends of Charles Bell, Lord Jeffrey, Horner, &c., I might have mentioned that he never mixed with party politics. The great physiologist, to whom medicine owes the discovery of the laws of the nervous system, was not indifferent, as we have seen, to the contest of opinions, although he never took any active part. He naturally inclined towards the side of the Whigs, if we may judge by his most intimate connexions; but he had, also, friends amongst the Tories, and he had not forgotten that his father was a Jacobite. In fact, he held himself independent in his political notions, as on points of morality and religion, without introducing any expression of them into his school or his works. When he suffered himself to be involved in the dispute, more philosophic than physiological, excited by the lectures of Professor Lawrence, he avoided even mentioning the name of the champion whose gauntlet he took up. Except in this single instance, Sir Charles Bell was always more ready in defence than in attack.

Chapter II., p. 38.

"*Sir Astley Cooper*," &c.

The life of Sir Astley Cooper presents a marked contrast to that of Sir Charles Bell. The *Revue*

Britannique has given an extract from the biography composed from his notes by his nephew, Mr. Bransby Blake Cooper (2 vols. 8vo. London, 1843). When writing an *Anatomical tale*, of which Vesalius was the hero, as Sir Astley Cooper was then alive, I omitted certain traits which would rather have recalled the surgeon of George the Fourth than of Charles the Fifth. I sent this little romance to Sir Astley, who reproached me in a friendly tone for not having attributed to Vesalius a more exclusive passion for the *subject*. He admitted, however, that *if he could have found time*, he would have been as much disposed to love, and more successful in his attachments than the Vesalius of my story. But he was really prouder of some of his surgical operations, particularly of the ligature of the aorta, than of all the triumphs in gallantry "*he might have achieved*," as he modestly added. In the post-script to his letter, he said, "If you had applied to me, how many curious adventures I could have furnished you with! and, amongst others, some that would have enabled you to introduce the *resurrectionists* (the body-snatchers)." This was the melodramatic portion of his career. In addition to his manual dexterity, Sir Astley Cooper was remarkable for the penetration of his first glance. Mr. Blight, of Deptford, was shot by an unknown assassin; Sir Astley being called in to attend him, said, the moment he examined the wound, "A pistol has been fired at you with the left hand." When he saw Patch, Mr. Blight's partner, he was struck by the peculiar expression of his countenance, and observed

in an under-tone, "If that gentleman were left-handed, I should suspect him of being the murderer." Patch was left-handed. Being apprehended, tried, and condemned, he confessed the crime previous to being led to execution.

CHAPTER II., p. 83.

"First lecture at the Royal Society," &c.

In the third edition of the *Nervous System*, a note to the paper *On the Nerves*, extracted from the *Philosophical Transactions*, tells us, "This paper was read before the Royal Society, on the 12th of July, 1821. About this time Sir Humphrey Davy was delighting all scientific men with his discoveries. When in their society, it was often remarked to me, 'In your department, we can expect nothing new. After so many eminent men in a succession of ages have laboured on your subject, no further discovery can be expected.' This showed great ignorance of anatomy, since it is a *department* where every improvement points to something new, and the higher we go, the more is the field of view extended."

Every day, in fact, the field of discovery opened by Sir Charles Bell continues to enlarge, and this very morning (Sept. 10th), I read in a *scientific review*, by M. Léon Foucault, that M. Cl. Bernard has lately demonstrated that the chemical modifications in the colouring of the blood operate under the influence of two nerves which have a distinct origin, and exercise actions in

some degree antagonistic: in other words, there is one glandular nerve which makes the veiny blood red, and another which makes it black.

It seems strange that Sir Charles Bell never reprinted his first paper on a *New Anatomy of the Brain*, now become so rare, that it is almost impossible to find a copy in circulation. We have lately read in the *Lancet*, a letter from Mr. Ward, who says that he has one dated 1809. Charles Bell usually stated that he published it in 1811. I suspect the original pamphlet was not in his own library.

The work on the *Nervous System* contains:—

1. Introduction:—History of the anatomy of the nervous system.

2. General view of the nervous system:—Of the connexion of the nerves of sensation and of voluntary motion with the spinal marrow and the cerebrum.

3. On the nerves:—A view of their structure and arrangement, with an account of some experiments illustrative of their functions, &c., &c.

4. On the nerves of the face:—In which it is shown that two sets of nerves, hitherto supposed to be similar, differ in structure, sensibility, and function.

5. On the nerves of the face:—Of the motor or manducatory portion of the fifth nerve, the *ramus buccinalis labialis*.

6. On the nerves which associate the muscles of the chest in the actions of breathing, speaking, and expression.

7. On the motions of the eye.

8. On the nervous circle which connects the voluntary muscles with the brain.

9. On the relation of the nerves of motion and of sensation and the brain; and particularly of the medulla oblongata and the spinal marrow.

10. Appendix of pathological cases.

11. Three papers on the nerves of the encephalon, as distinguished from those arising from the spinal marrow.—From the *Transactions of the Royal Society of Edinburgh.*

Chapter III., p. 90.

"*Conjectural physiology, &c.*"

It must be remarked here, that Barthez admitted in his physiological doctrine the distinction between nerves of sensation and nerves of motion; but, as in his day, the distinction was a probable inference without anatomical demonstration, he made it one of the properties of his vital principle; a law of nervous action. He objected to ascribe it to a purely mechanical cause, and preferred the hypothesis of a nerve endowed with a double nature (the sensitive and motive power); satisfying himself that this double nature was materially produced from the double root of the vertebral column. Barthez, with an intellect equally subtle and profound, willingly opposed one conjecture to another; as, for instance, when he endeavoured to explain the phenome-

non of *crossed p ralyses*, by assigning to the brain a permanent tonic motion, subdued in the natural state, and susceptible of increase to the extent of spasmodic contraction. It has been a mistake to attribute these and other hypotheses to the vitalistic doctrines of the school of Montpellier, where Barthez, greatly admired for his genius as he was, had no greater influence than M. Baumes has since possessed. The field of conjecture was not less free and extensive in the school of Paris; and Bichat added more than one to his own experimental discoveries. Barthez himself would now, if he were alive, yield to anatomical evidence.*

Chapter III., p. 104.

"*Erratum and completion of the text.*"

To complete his demonstration, after having repeated that his own experiments in accordance with facts collected by pathologists, had soon convinced him that these nerves, in appearance irregularly diverging, combined in one simultaneous effort, the nostril, the throat, the uvula and velum, the larynx, the diaphragm, and the external muscles of respiration,—Charles Bell did not forget to add, that by dividing the *portio dura* of the

* It has been *supposed* that there are certain nerves which feel, and others that convey motion, in order to explain the existence of anæsthesia without paralysis, and of paralysis without anæsthesia. Barthez prefers to these *inventions* the simple statement of the fact as explaining a law of nervous action. Lordat, *Exposition of the Medical Doctrine of Barthez*, p. 211.

seventh pair,* the nostril became stationary; by dividing the pharyngean nerve, the velum fell; by dividing the laryngean nerve the glottis ceased to perform its part in inspiration; by dividing the phrenic nerve, the diaphragm stopped; by dividing the spinal accessory, the mastoid ceased to raise the shoulder; finally, by wounding the side of the medulla oblongata, whence these nerves proceed, the entire act of respiration ceased, and the animal expired.

Chapter III., p. 109.

"*The revival of an idea of John Hunter.*"

"While printing the last sheets of these papers, I took up Mr. Hunter's work on 'Animal Economy,' to consult him on the distribution of the nerves to the nose. I was as much surprised with the following passage as if I had never before read it. This work of Mr. Hunter's was my earliest acquisition as a medical student, and often perused with deep interest. I believe I might trace back the course of my reflections to it, although during the prosecution of this subject it never

* I request the reader to forgive an erratum I have here made, by substituting in the text the *facial nerve* for the *dura mater*. The facial nerve, or *portio dura* of English anatomists, is also called the respiratory nerve of the muscles of the face. Issuing from the medulla oblongata by a single root, this nerve, says Charles Bell, in a note to his second paper, has an origin which places it in double relation with the column of voluntary motion and with the common origin of respiratory nerves.

occurred to me that I was indebted to him. I have often hung over the plates of Monro, certain that there was an arrangement to be discovered which would explain the seeming confusion of the nervous system, but I was not so sensible of what I owed to Mr. Hunter. I am happy that I fall so opportunely on this passage, and inexpressibly gratified to find a support of some of my opinions in such authority: 'The nerves being in themselves, perhaps, the most difficult parts of an animal body to dissect, becomes a reason why we are still unacquainted with many of their minute ramifications; yet, if a knowledge of these, together with that of their origin, union, and re-union, is at all connected with their physiology, the more accurately they are investigated, the more perfectly will the functions of the nerves be understood. I have no doubt, if their physiology was sufficiently known, but we should find the distribution and complication of nerves so immediately connected with their particular uses, as readily to explain many of those peculiarities for which it is now so difficult to account. What naturally tends to this opinion is, the origins and number of nerves being constantly the same; and particular nerves being invariably destined for particular parts. The fourth and sixth pair of nerves are remarkable instances of this; and we may reasonably conclude that every part has its particular branch allotted to it; and that however complicated the distribution may be, the complication is always regular. There are some nerves which have a peculiarity in their course, as the recurrent and chordi tym-

pani; and others which are appropriated to particular sensations, as those which go to four of the organs of sense—seeing, hearing, smelling, and tasting; and some parts of the body having peculiar sensations (as the stomach and penis), we may, without impropriety, include the fifth, or sense of feeling. This general uniformity, in course, connexion, and distribution, will lead us to suppose that there may be some other purpose to be answered more than mere mechanical convenience; for many variations have been described in the dissection of nerves, which I believe to have arisen from the blunders of the anatomist, rather than from any irregularity in their number, mode of ramifying, course, distribution, or connexion with each other.'"—CHARLES BELL, *Nervous System*.

CHAPTER III., p. 134.

The plan of my work necessarily excluding mention of many new researches in the nervous system, of which Charles Bell's discovery forms the true point of departure, and in which the German physicians have distinguished themselves, I have avoided speaking of the two substances which compose encephalic matter; of galvanic experiments on nervous sensibility; of the action of different poisons;—amongst others, of those that are curative;—and, finally, of the relation between electricity and the double current of the nervous force, the nerve being looked upon as an electric cable. (See

in the Report of the Academy of Sciences, the note entitled, "*On the speed with which the nervous agent diffuses itself in the rachitic nerves.*") By means of an extremely delicate galvanic apparatus, M. Helmholtz has been enabled to calculate the time necessary for the transmission of the nervous force of one muscle of the frog to another. In an extent of from 50 to 60 millimetres,* the medium rate would be, according to these minute experiments (worthy of the sages of Laputa), from 0·0014, to 0·0020 in a second! (See also the experiments of M. Dubois-Reymond of Berlin.)

Chapter III., p. 116.

"*Recurrent sensibility.*"

If recurrent sensibility had been a mere illusion, this phenomenon would never have supplied the text for a serious discussion in the lectures and works of such professors as MM. Flourens and Claude Bernard. In his two volumes on the *Physiology and Pathology of the Nervous System*, Paris, 1858, the last-named physiologist examines again with special attention the distinct properties of the anterior and posterior roots of the rachitic nerves. According to him, if, in operating on these nerves, you do not always find the anterior roots sensitive, it is because the pain and fatigue of the operation may in some manner have destroyed all

* A millimetre is the thousandth part of a mile.

mediate and immediate sensibility. Immediately after the opening of the rachis, the animals should be allowed to rest, that they may recover from the general disorganization produced by laying bare the marrow. M. Brown-Séquard, who has made so many experiments on the rachitic nerves, in his last lectures finds fault only with the expression proposed by M. Magendie, and adopted by MM. Flourens and Bernard. "The term of *recurrent sensibility*," he says, "is incorrect, because sensibility is a vital property, unable to shift from one place to another, and consequently it cannot be recurrent. It is the cause, whatever it may be, or the painful sensation which is *recurrent*, and not the sensibility." (*Course of Lectures on the Central Nervous System*, by L. Brown-Séquard.) See in the *Lancet* of the 2nd of July, the first lecture, entitled, *Truth of Sir Charles Bell's theory relative to the existence of two distinct branches of nervous conductors, the sensitive and the motive.* M. Brown-Séquard has undoubtedly taken a very prominent part in experimental physiology. We particularly owe to him the valuable experiments on the intersection of the nervous pairs, and the exact definition of the distinctive functions attributed to the anterior and posterior columns of the spinal marrow, and also of their connexion with the phenomena of motion and sensibility. Pathology and physiology mutually aid each other in the researches of this learned physiologist.

Chapter III., p. 96.

"*The finger-board of the nerves and the Transatlantic Telegraph.*"

The American press, which indulges freely in metaphors, has lately borrowed from the vocabulary of anatomy and of the physiology of the nervous system, to express the rapid interchange of thought which the laying down of the Transatlantic cable has established between the two hemispheres. A New York paper, of the 10th of August, writes thus: "The world is now completed: its spinal cord is laid down, and it begins to think. A living nerve has been unrolled from the Anglo-Saxon heart, to unite in a bond of love the old and new world." The American journalist places the seat of intelligence in the spinal marrow, and derives from the heart a nerve of transmission, which perhaps had no existence before the electric telegraph. May the latter henceforward never cease to transmit from one world to the other cordial feelings and sentiments of benevolence, with scientific and literary communications.

Chapter III., p. 100.

"*Dr. Marshall Hall and reflective action.*"

Sir Henry Holland declares confidently, in an exclusive chapter on the nervous system, that perhaps the most important consequence of the discovery of

the distinct functions of the nerves, is the determination of those sympathies or reflective actions between the nerves of motion and sensation which take place directly through the spinal marrow without the intervention of the brain. As I say in the text, it is pre-eminently to Dr. Marshall Hall that physiology is indebted for this development of Sir Charles Bell's system; for his applications to pathology have thrown an entirely new light on the morbid affections of the nervous system, until then imperfectly understood and often ill-defined, both as to their course and progress.*

Philosophic language is indebted to Charles Bell for having banished certain definitions which gave false ideas of human organization. Hartley could no longer say that thought is *a vibration of the fibres of the brain;* nor could Hooke venture to assert that the brain contains a matter intended to receive the impressions of sound, which may be compared to the bells or urns, placed, according to Vitruvius, in the ancient theatres. This same Hooke pretended that thought was a radiation of the soul from one part of the brain to another. (*Psychological Enquiries by Sir B. Brodie.*)

CHAPTER III., p. 120.

The first idea of vegetable morphology is to be met with in Linnæus and Jussieu. Linnæus says, in the in-

* *Chapters on Mental Physiology*, 2nd ed., p. 277.

troduction to his *Systema Naturæ*, "*Prolepsis* or anticipation shows us the mystery of the metamorphosis of plants, through which the *herb*, which is the larva or imperfect plant, changes itself into decided fructification. When a tree produces a flower, nature anticipates the produce of five years, forming the *bracteæ* from the buds of the following year, the cup from those of the second, the petal from those of the third, the stamens from those of the fourth, and from the fifth, the pistils filled with the granulated marrow of the seed;—and this completes the term of vegetable life."

This fragment and another from the work of Linnæus on *Botanical Reform*, by no means deprive Goëthe of the merit of his discovery. Professor Whewell, in his *History of the Inductive Sciences*, says, "Goethe discovered by *deduction* what Linnæus discovered by *induction*." But M. P. de Candolle may claim the honour of having confirmed and established the metamorphic doctrine by his theory of *degeneracy* or *abortion*, and of *adhesion* or *soldering;*—the absence or abortion of an organ showing him the tendency of all plants to gravitate towards a perfectly regular or symmetrical type.

Goethe's discovery dates from the year 1790. During the year preceding, Lawrence de Jussieu had applied the notion of vegetable metamorphoses to the explanation of double or monster flowers. This great botanist found in the embryo of the *prolepsis* of Linnæus the anticipated determination of the form and functions of the plant.

Chapter III., p. 123.

"*The eggs of the ant*," &c.

In the comparison borrowed from Bacon, this great philosopher was perhaps ignorant that the eggs of ants are nothing more than their larvæ. But the expression is still adopted which was in use when all the world was ignorant of the fact.

Chapter III., pp. 124, and following.

Circumscribed by the object, the limits, and the title of his dissertation, Sir Charles Bell was obliged to omit from his plan any estimate of the labours of Harvey, who has lately found such an able historian; and any chemical examination of the composition of blood, which has lately undergone new analyses. He lays aside all account of the opinions Harvey had to refute before he could establish his own, without being tempted by the close analogy of his own studies and personal difficulties; he tells us nothing of Servetus, Colombo, Carpi, Fabricius of Aquapendente, Vesalius, Cisalpinus, Bartholinus, Pecquet, Aselli, Malpighi, and Spallanzani;—who have all more or less contributed to prepare or complete the great discovery of the whole system of circulation, comprising that of the heart, the lungs, the arteries, the veins, and the capillary vessels, including those of chyle and lymph. Each of the works dedicated to this subject presents interest abounding in attraction

without demanding from the reader any very profound knowledge of physiology. M. Flourens prepares us admirably for that study, and after him we can readily approach the authors I have named, or the more modern physiologists, such as Blainville, Milne-Edwards, Bérard, Poiseuille, Rouanet, Gerdy, Volkmann, Nega, Donders, Kölliker, Brown-Séquard, Draper, Wharton Jones, &c. The greater part of these authors have been profitably laid under contribution in the *Elementary Treatise* of M. J. Béclard, chap. iv. pp. 208 to 295. I suggest to him for his new edition the original hypothesis of Mr. Draper (*Human Physiology*) on the principle of the movements of the blood. Mr. Draper assumes that arterial blood, saturated with oxygen, spontaneously traverses the different parts of the body in search of organic particles with which it has affinity. As soon as this affinity is satisfied, the blood, now become veinous, is pushed onwards by the liquid column, which follows it with a similar want to satisfy. It is, therefore, the arterialization of the blood in the lungs which causes circulation.*

CHAPTER III., p. 139.

"*The muscular sense, the cerebellum, the vital principle,*" *&c.*

My first studies in physiology under M. Lordat, the

* In the numbers for June and July, 1858, *Blackwood's Magazine* published two excellent articles on the history of circulation, and on the physiology of the blood.

eloquent interpreter of the doctrines of his master, Barthez, have probably left on my mind a sort of prejudice in favour of the vital principle, alternately admitted as a rational existence, a living force, or an intelligence independent of the soul; and I readily admit having attributed to it formerly, in various notices, some of the phenomena to which physiology has more recently attached a special organ. This is the function of the equalization or co-ordinance of our movements —the muscular sense so well defined by Charles Bell, and so ingeniously localised by M. Flourens. The objections still opposed to M. Flourens, and the absence of pathological cases to confirm his experiments upon animals, still permit doubts to exist on the discovery of the exclusive *use* of the cerebellum. A physiological physician of the first order (Sir Henry Holland) while strongly inclining towards the opinion of M. Flourens, mentions two negative cases, or rather two cases in which autopsy revealed no alteration in the cerebellum, although one of the most salient symptoms of the disease was the trouble or disorder of the motions of the body. Sir Henry Holland adds that, perhaps, certain alterations of the cerebellum as of all other parts of the encephalon, have, as yet, evaded the most minute analysis. Who can say whether the principle of the function may not reside in an almost imperceptible point of the organ, which M. Flourens may some day determine with the same precision as that of the vital knot in the medulla oblongata, the limits of which he has fixed in such a manner as to enable us to

say that this point, upon which the life of the nervous system depends, and consequently the life of the animal—in a word, *life* itself, is not larger than the *head of a pin*. See the work entitled, *Of Life and Intelligence* (1858),* in which M. Flourens has devoted several pages to the theories of Barthez.

August, 1858.—M. Brown-Séquard seems to attribute to Dr. Carpenter the first idea of making the cerebellum the special organ of the sense called *muscular*, and he adds, that in the last edition of his *Human Physiology*, this English physiologist explains that the cerebellum re-acts only by a reflective action upon the impressions that reach it, without being itself the instrument of communicating these impressions to our consciousness. In another part of the lecture, in which M. Brown-Séquard thus expresses himself, without quoting either M. Flourens, or Hartwig, who maintains a similar doctrine in Germany, he assumes, in turn, that it is by the irritation they produce on different portions of the base of the encephalon, that the diseases of the cerebellum, or its removal in animal cases, cause the disordered motions which have been looked upon as dependent on the absence of a directing organ. He adds, "The least irritation of the different parts of the encephalon by the point of a needle, can create nearly the same disordered motions which follow the removal of the cerebellum. As regards birds, I have found for a

* *Chapters on Mental Physiology*, by Sir Henry Holland. London: 1858.

long time, that the simple exposure to the air of the rhomboidal ventricle of the spinal lumbar cord suffices to produce in the posterior members the disordered movements which exist after the removal of the cerebellum." To sum up what I have said in the text, and what I add here, on the *vital principle* of Barthez and the *sixth sense* of Bell, I confess that, in my opinion, on this point of discussion, the physiologists have perhaps discovered more new words than new facts, including those who suppose the existence of a *cerebral development unconscious of itself;*—for so they designate, I believe, an intellectual activity of the brain capable of performing its functions automatically, *without knowledge* or attention.

CHAPTER IV., p. 154.

"Physicians fond of fishing," &c.

I am acquainted with a doctor not less in love with fishing than Charles Bell—my associate Dr. Allégre, of Hyères. This name calls up the remembrance of a year of clinical study in the naval hospitals at Toulon, under Professors Droguet and Fleury, with our fellow-students Gaymard, Ruy, and Mouriés—rare exceptions of high intelligence, to be coupled with Dr. Allégre himself. I have somewhat forgot the lessons but not the friendships of that happy year.

Chapter IV., p. 159.

"Fortunately for Charles Bell," &c.

While writing this paragraph, I transported myself back in thought to the time when M. Lordat embodied my idea of oral teaching. It gives me much pleasure to extract from a work, composed now more than thirty years back, in conjunction with one of my school-fellows (Eugène de Salles), the following peroration of the second course of lectures, in which M. Lordat explained to us the secret of his method and his talent.

"What is the object of an oral course? Ought it to embrace all the principles and facts of which the science it treats of is composed? No; such a systematic summary ought to be included in a treatise; but the obligations of the professor are not those of the author.

"The latter could not do better than attempt to render superfluous all the books written before his own on the same topic; the former does enough if he excites a desire to read them, and renders the perusal easy and profitable.

"The accuracy and conciseness on which the best authors pique themselves in the exposition of principles, are inseparable from a sort of abstraction and dryness which may repel beginners. Oral teaching ought to attract minds to the study of these dogmas, by imparting to the most abstruse the light produced by a multiplicity of examples, a certain charm engendered by the logical accent of expression, and an indescribable but

seductive interest springing from the immediate intercourse between the master and his pupils. The author is content to establish essential propositions, and omits what may be supplied by reflection. The professor conducts his pupil by the hand through all the mental operations which ought to fill the intermediate space; he thinks aloud, as the artificer who trains up an apprentice executes in his presence the work he wishes to teach him, before he confides the instrument to his hands, and commits his conduct to the principles of art alone.

"All the objects which fall within the range of a science, and which the author considers himself bound to include in his work, have neither the same difficulty nor the same importance attached to them, as regards the final end proposed in the composition. It belongs to the professor to select those which most require his explanations, and appear to him likely to exercise the greatest influence on the future progress of his pupils.

"It also falls within his province to supply useful principles which may have escaped his auditors; to discuss those opinions of the day which obtain credit from the celebrity of a writer; and to anticipate distaste and lassitude by changing the subject as soon as the one he is treating of becomes tiresome.

"Of all the varieties of form in which an idea can be clothed, there is none which equally finds access to every mind. What appears to one a clear and precise expression, seems obscure and analogous to another. Whether it is that words are not received by all in

the same sense, or whether great distinctions in elementary education have not introduced still greater varieties as mental culture advances.

"Now, in oral teaching, an actual colloquy is maintained in which the auditor expresses himself automatically by the features of his countenance, or his face reflects involuntarily the activity or sluggishness of his intelligence. The attentive professor understands this language; he understands it even to the doubts or objections opposed to his statements, and by turning a glance upon his auditory he at once recognises the necessity of proposing again the same dogma under different expositions, and of throwing new light on its various phases, until a general assent enables him to advance beyond it."

Let us not forget that the school of Montpellier has produced not only idealistic professors such as Barthez, but anatomists like Pecquet, whose discovery (the reservoir of chyle) equals that of Harvey and Bell. To one professor of Montpellier, Fouquet, we owe clinical medical instruction; to another, Fages, clinical surgical instruction.

Chapter IV., p. 176.

I could here very willingly devote a few commemorative lines to Professor Roux; but I refer the reader to the eloquent panegyrics delivered in 1855 on the part of the faculty, by M. Malgaigne, and on that of the Academy of Medicine, by M. F. Dubois. In the

biographical fragments annexed to his two entertaining volumes, entitled *Physic and Physicians*, my fellow-countryman and literary associate, M. Piesse, has done ample justice to the distinction universally accorded to M. Roux, and which, M. Piesse says, is more accurately expressed in English than in French, by calling him *a perfect gentleman*. I should have quoted freely from M. Roux's *Surgical Journey to London*, if I had completed the analogous work which he himself encouraged me to undertake.

CHAPTER II., pp. 43 to 50; IV., p. 182.

Sir Charles Bell's work on the *Anatomy and Philosophy of Expression*, the title of which has been twice changed, is so little known in France that it is not even bibliographically named in the special memoir published by M. L. Piesse, on the use of *anatomical and physiological studies in the art of drawing*. See in this paper (*Physic and Physicians*, vol. ii. p. 238) what the author, who thus comes in contact with Charles Bell, says so justly on form and action, the two elements which the human body always presents simultaneously for the imitation of art. "The body acts even in what is called repose; for repose invariably expresses itself by an attitude, and an attitude is the result of a dynamic state. The consideration of forms belongs to *anatomy;* that of action or movement to *physiology*." M. Piesse quotes the work of M. Gerdy,

The Anatomy of the External Forms of the Human Body, and although somewhat restricting the importance of pathological study, he does not deny that surgeons have some right to an opinion in paintings of battles. "They would be supported by the authority of Salvator Rosa, who, when the Academy of St. Luke at Rome refused to admit a painter who was also a surgeon, said to his colleagues, 'You have committed a great mistake in rejecting him, for he would have done good service in re-setting the limbs of the figures you mutilate daily.'" I regret on M. Piesse's account that he has not read, at least, the two essays which conclude the fourth edition of Charles Bell's work; one, On the Study of Anatomy as necessary to Design, and On the Genius and Studies of Michael Angelo; the other, On the Uses of Anatomy to the Painter.

CHAPTER IV., p. 155.

"*The inspiration of the country*," *&c.*

Here again I might quote Sir Isaac Newton, represented by his nephew Humphrey as taking two or three turns in his garden, stopping suddenly, seized with an idea, and then hurrying to his study, exclaiming, with Archimedes, *Eureka!* There he at once committed his discovery to paper without even sitting down.—*Life of Sir Isaac Newton*, by SIR DAVID BREWSTER.

Chapter IV., p. 199.

Sir Isaac Newton wrote to Leibnitz: "I was so persecuted with discussions arising from the publication of my theory of light, that I blamed my own imprudence for parting with so substantial a blessing as my quiet to run after a shadow."—*Life of Sir Isaac Newton*, by Sir David Brewster.

Chapter IV., p. 200.

"*Charles Bell was regretted*," *&c.*

On reading the correspondence of Sydney Smith, published by his daughter Lady Holland, and Mrs. Austin, I observed the following letter, addressed to Lady Bell:—

"56, Green-street, Grosvenor-square,
"November 26th, 1842.

"My dear Lady Bell,

"What has a clergyman to offer but sermons? Look on this,* and if you like it, copy it, and return it here before the 6th of December. They are common arguments, but I know no other; and attribute what I send, not to vanity, but kindness—for your state affected me very much. I will call upon you very soon. Ever yours,

"Sydney Smith."

* This sermon was published after Mr. Sydney Smith's death. "We are perplexed, but not in despair." This text sufficiently indicates that Sydney Smith alluded to the still recent bereavement of Sir Charles Bell's widow.

When on the point of closing this Appendix, the *Times* of Sept. 11th, which arrived this morning, proves to me that I have not said too much in the text (p. 34), on the slow progress of assimilation between Scotland and England.

We read in this journal, in reference to the observance of the Sabbath :—"Scotland, notwithstanding a union of a century and a half, is still, in more than one respect, a foreign country in the eyes of Englishmen. We have conquered Ireland, and have introduced there our English laws, our customs, and our own mode of living. In Dublin there is a Court of Chancery and a Court of Queen's Bench, answering to the English system; the established church of Ireland, so often attacked, is founded in perhaps too close an analogy with our own. But our fellow-citizens on the north of the Tweed have maintained their independence as completely as in the days of Wallace and Bruce. The most ardent partisan of the privileges of Scotland ought to be satisfied when he sees a part of this island, containing less than three millions of inhabitants, possessing laws and customs which differ so profoundly from those which prevail in England and Ireland."

Since the publication of my work, Mr. G. H. Lewes, in a paper read at the meeting of the British Association in Aberdeen, suggested the advantage of a new nomenclature to replace the lax expressions now used by

authors who write on the *nervous system.* According to Mr. Lewes, the old term *nervous forces* (which confounds together the action of the nerves and that of the centres) requires two distinct solutions; one expressing the activity of the nerves—*neurility;* the other, the activity of the centres—*sensiility.* In his *Physiology of Common Life,* Mr. Lewes has stated more explicitly the object and scope of his proposed reform in nervous physiology.

THE END.

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